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The Outlook

Rumour-Mongering

DURING the war, when all manner of things were treated as secret—often for no very obvious reason—the number of rumours which gained currency every time a new aircraft or engine went into service was legion. The stories usually started with a somewhat grudging praise of the new type, and this was in most cases followed by a "but." The machine swung badly on take-off, or it had unpleasant characteristics near the stall, or the undercarriage stuck in the half-retracted position, and so on and so forth. The new engine was fine, it gave a lot of urge—but it was very rough, or it cut out, or did something else.

Usually there was, of course, some basis for the rumours, such as, for instance, the case of one type which became famous, but which did have a certain amount of teething troubles with its undercarriage. In a short while these were cured (actually before the aircraft became operational), and when a member of the technical staff was later asked about this undercarriage, his reply was "It is fine now; it works nearly every time." But the inevitable result of the secrecy regulations was that, in being passed from mouth to mouth, faults became, like the death of Mark Twain, greatly exaggerated.

In peacetime there is far less excuse for rumour-mongering, but the evil is by no means dead, even if its causes and origin are different. Recent aviation history has not been without examples. The remedy is very largely in the hands of manufacturers themselves. It has been the custom, almost since flying began, to pretend that after the first test flight the pilot reported everything perfect. Yet the percentage of cases in which that was true must be very small indeed. There is nearly always something which requires to be improved. Aircraft design is still a long way from being an exact science, and in the long run there is nothing to be gained by trying to hush things up. The only result is that minor faults and troubles are magnified into major ones, and once a new type has been besmirched by rumour it takes a very long time to get rid of the general notion that "there must be something seriously wrong with it; no smoke without a fire, you know." There can be very few firms in all countries which have not suffered from the effects of such talk.

Curing the Evil

ALTHOUGH most of the designing firms at home have taken the technical Press into their confidence by stating frankly what their troubles have been, it has remained for the de Havilland Aircraft Co., Ltd., to take a step which, in our view, might well be followed by other firms. We have just received a copy of a bulletin, issued to all de Havilland representatives, which sets forth simply and clearly in opposite columns the faults encountered and the remedies adopted or suggested in the case of the Dove and its Gipsy Queen 70 engines. There is, of course, nothing unusual in that; what is unusual is that a covering letter from the company informs us that we are at liberty to make any desired use of the information. In other words, this is the first time a firm has given the technical Press *carte blanche* to publish its trouble sheet. Unfortunately, the pressure on our space is so great that we cannot publish the bulletin this week, but a careful perusal of it shows that, in the main, the faults have been of a fairly trivial nature, and in many cases the remedy appears to have been well within the normal range of maintenance.

To obtain a proper background to the troubles and their remedies it is necessary to recall that deliveries of the Dove, because of urgent demands from operators all over the world, began only ten months after the first flight, and that consequently the type had less development work behind it than it would have had in more normal circumstances. To make up for this fact, de Havilland engineers were sent out with every Dove de-

livered overseas; their reports have now been coming in for a year and form the basis of the bulletin.

We feel that the de Havilland firm has adopted a wise policy in thus being perfectly frank and open about the troubles encountered. To us it seems that nothing but good can result, and we should like to see the practice become general.

The Right Perspective

SELF-DEPRECIATION and excessive modesty can very easily be carried too far. British civil aviation has been suffering from the cumulative effect of persistent and often unfair home-grown criticism for a long time, and it is scarcely surprising if foreigners are ready to take us at our own evaluation.

Last week the Minister of Supply called a Press conference specifically to attempt to bring things into their proper perspective by counting some of our blessings. That civil aviation has been having and is still having a difficult time there is no denying, and it would be idle to pretend that in some classes our civil aircraft can compare with the best American. But by harping on the shortcomings, as so many papers have done, a very lop-sided picture has gradually been built up, and Mr. Wilmot did his best to correct that fault.

That the British aircraft industry has not been doing so badly, bearing in mind the difficulties with which it is beset, is obvious from the fact that, in the first five months of this year, exports amounted to something like £7¼ million, while estimates indicate that for the whole year the value may reach a figure of £20 million. Not only have Rolls-Royce and de Havilland jet engines been exported, but licences to build them abroad have been granted. Piston engines have been sold in many parts of the world, and among aircraft mentioned by Mr. Wilmot as doing well in the export market were the Dove, the Viking and the Wayfarer. Of the Dove he said that "It is proving a best-seller. A total of over 200 aircraft are covered by firm orders already placed, the largest being from Argentina." A review of the work being done by "interim" types showed that they are performing valuable services, and the Minister defended the decision on American aircraft purchases by saying that a short-term loss in sterling was preferable to dollar expenditure and loss of operational experience with British types. B.O.A.C.'s operational experience with Constellations was of more practical benefit to Lockheeds than to the British industry.

The importance of close co-operation between manufacturer and operator cannot be over-stressed, but it is not helped much by the present complicated system.

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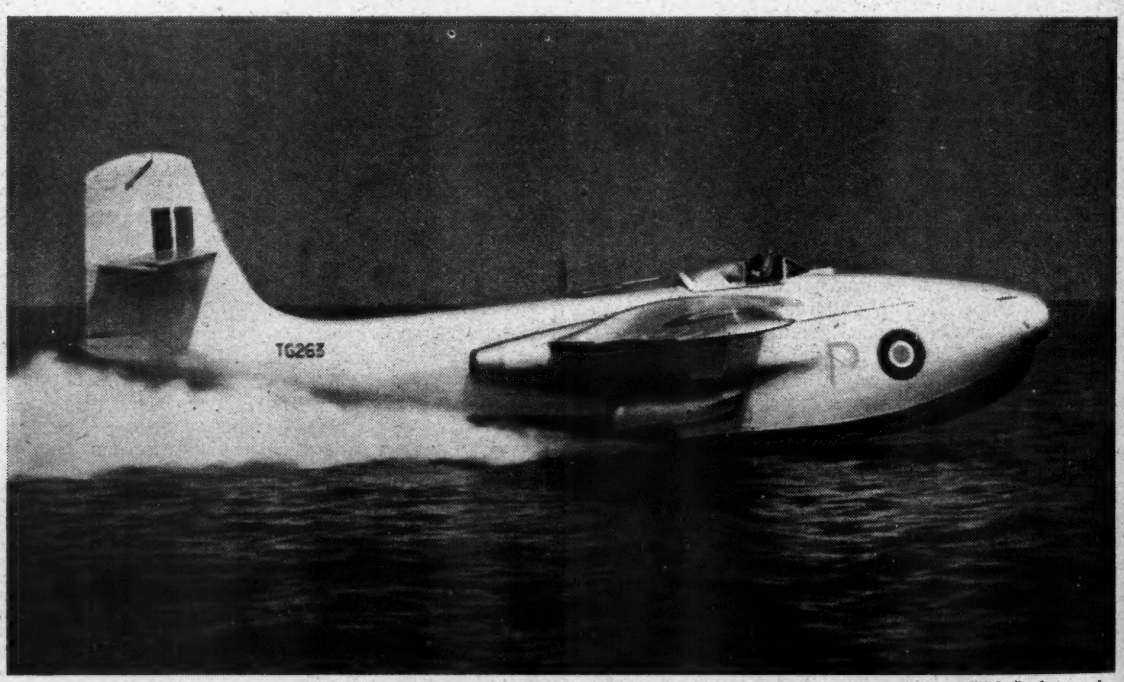
Forthcoming Events, page 136

"And why the sea is boiling hot—and whether pigs have wings"—LEWIS CARROLL



"Flight" photograph.

S.R/A1: In his most imaginative moment the author of "Alice in Wonderland" could hardly have foreseen a craft which is thrust by the reaction of hot gases into the air from a sea which at times literally boils around it. Such a craft is the new Saunders-Roe flying-boat fighter which, as our picture proves, however, is by no means a flying pig.

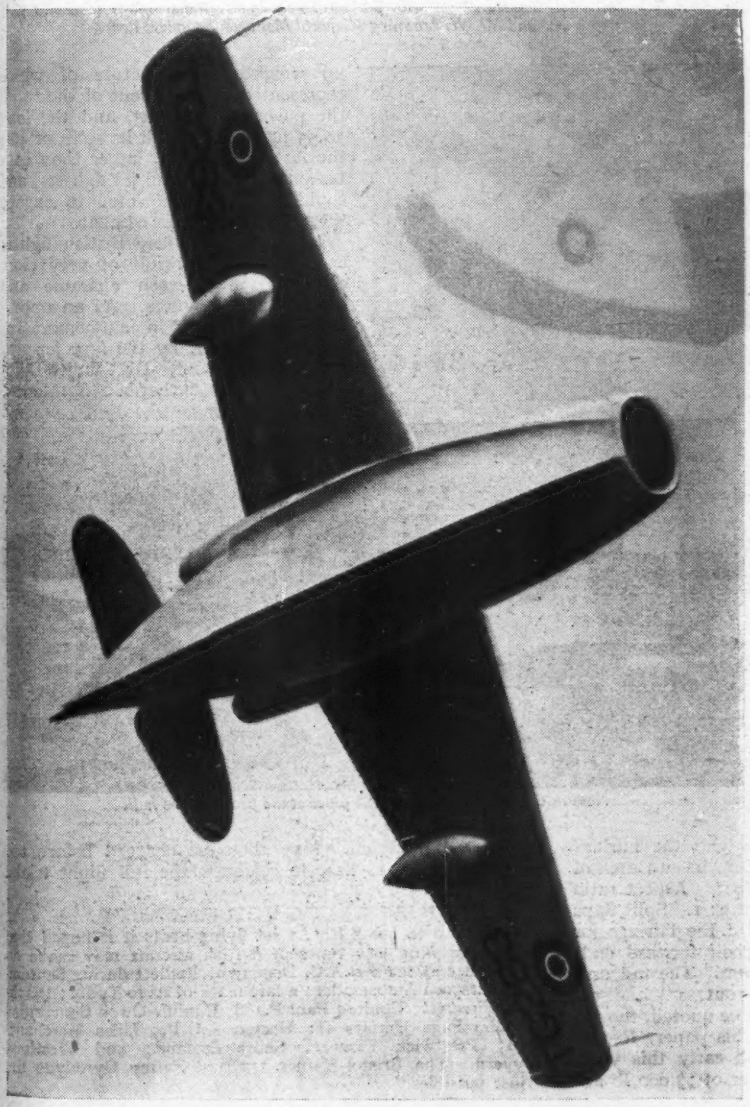
Introducing THE SARO A1

Geoffrey Tyson Demonstrates New Jet Flying-Boat at Cowes

Illustrated by "Flight" photographs

AT lunchtime last Wednesday week the first of three prototypes of the new Saunders-Roe S.R./A1 jet fighter flying-boat, powered by two Metropolitan-Vickers Beryl (F2/4) axial-flow turbo jets, took off from Cowes in about 12 seconds for her first run over the M.V. *Medina*. In this craft and attendant launches representatives of the R.A.F., Naval Aviation, the Royal Aircraft Establishment, at least one foreign government, Saunders-Roe, Ltd., Metropolitan-Vickers and the Press, waited for the unique aircraft to show her paces. It was Geoffrey Tyson's fifth flight in the machine, the first having been made on July 16th, since when no modifications of any consequence have been demanded.

The quick, short take-off and subsequent steep climb were particularly remarkable because the Beryls at present installed are de-rated to only 3,300 lb thrust. Units of 3,500 lb are immediately available, and the Beryl has lately passed its official type test at a rating of 3,850 lb. It must be made clear, incidentally, that in this instance the name is that of the precious stone, and not of any particularly inspiring Metrovick personality.



Off in 11 Seconds

For the photographers Tyson made four take-offs and landings, flew tight turns and came past very low at speeds up to 400 m.p.h., the highest he has yet attained. His shortest take-off could hardly have taken more than 11 seconds; this was one of two during which he retracted his stabilizing floats as soon as he felt that he had lateral control of the aircraft. His flying and judgment of distance were, as always, flawless, and he later told us that he is "remarkably pleased" with the handling of the boat. Water performance seems to be especially good in view of the aerodynamic qualities of the design. So far, of course, maximum speed has not been approached, but with two Beryls of 3,850 lb thrust this may well be considerably in excess of 500 m.p.h. Much testing remains to be done, particularly at height, and it is improbable that Tyson will attempt any aerobatics at the S.B.A.C. display this year. All being well, however, visitors will be given an indication of what can be accomplished by a really modern marine fighter.

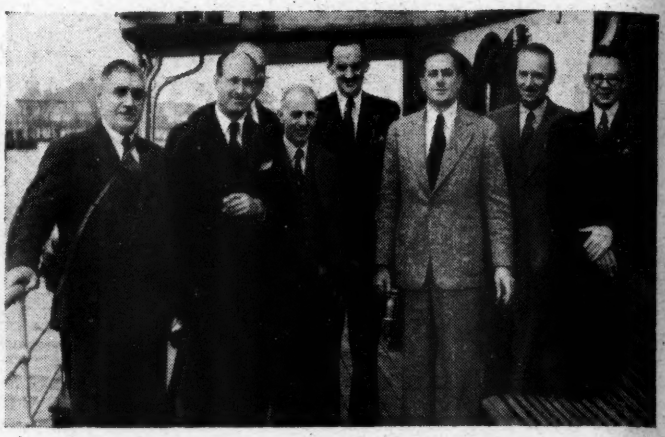
Points which were particularly noticed, apart from Tyson's confidence, were the relative silence of the Beryls and the absence of any deposit on the hull aft of the jet pipes (due, no doubt, to the fact that the effluxes

A perfect example of demonstration flying: Geoffrey Tyson makes a tight circuit for the benefit of the photographers and observers aboard the "Medina."

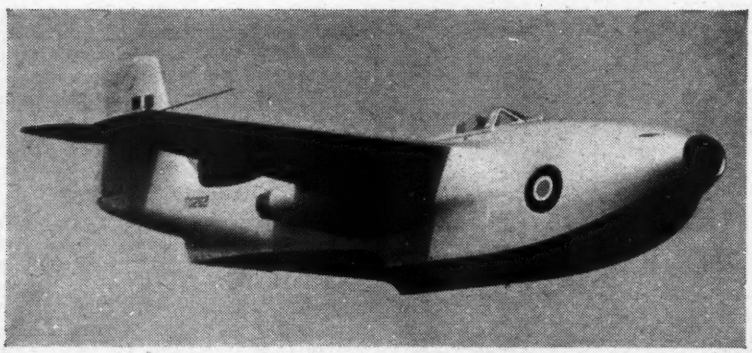
Introducing the Saro A1 . . . . .

are slightly outboard). No rough-water tests have yet been attempted—indeed, the A1 is not intended for open-sea operation—but Dr. D. M. Smith, Chief Engineer, Gas Turbine Dept., Metropolitan-Vickers, tells us that salt water has been sprayed into the intake of a Beryl on the bench, resulting in a very slight reduction of performance and a deposit of salt on the compressor blading. This deposit was readily washed off by spraying with fresh water. As a precaution, however, provision is made in the S.R./A1 for an extensible intake.

The potentialities of the flying-boat fighter have already been discussed in *Flight*, but little has yet been published concerning the technical features of the S.R./A1. Though of very clean design, the hull is relatively bulky. Obviously, there is ample space internally between the power units and it might be possible to seat a technical observer in the "engine-room." Moreover, the aircraft would appear to be adaptable for an additional operational crew member, suggesting a wider field of usefulness than at present contemplated.



Aboard the "Medina": Mr. D. McArthur (Director, Metropolitan-Vickers), Mr. H. Knowler (Chief Designer, Saunders-Roe), Mr. R. V. Perfect (Saunders-Roe), Dr. D. M. Smith (Chief Engineer, Gas Turbine Department, Metropolitan-Vickers), Capt. Clarke (Managing Director, Saunders-Roe), Geoffrey Tyson (Chief Test Pilot, Saunders-Roe) with presentation "can", Major Mayo (consultant), and Mr. W. Browning (General Manager, Saunders-Roe).



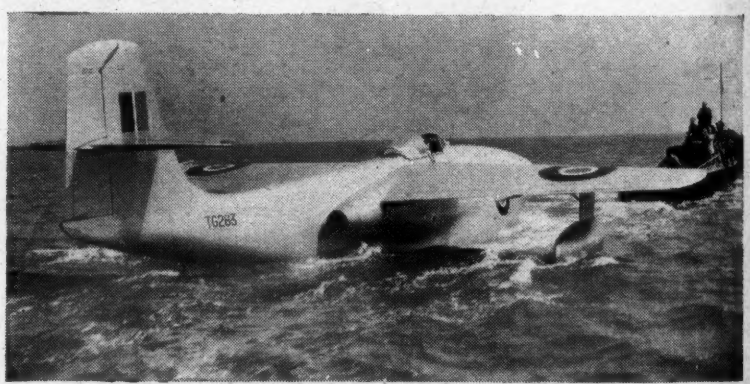
Though lacking beauty in the classical sense, the S.R./A1 displays many attractive design features.

Structurally the hull, which is 50ft long and has a beam of 6.83ft, follows the latest Saunders-Roe practice, having closely spaced frames and relatively light stringers. Ports for the four 20 mm guns are let into the deck aft of the air intake, which has an internal guard. The gun covers are hinged. It will be seen from the photographs that the cockpit is well aft, the pilot being seated in line with the leading-edge of the wing. In common with other modern jet fighters, the A1 is designed to take an ejection seat and to have a pressurized cabin.

The wing, the roots of which merge with the fairings over the jet units, is of high-speed section, has an area of 415 sq ft, and is built round a single spar. Aspect ratio and taper ratio are respectively 5 : 1 and 2 : 1. Split flaps of high aspect ratio are fitted inboard of the fairings for the retractable stabilizing floats. At their forward ends these floats have a double planing bottom. The tail unit and all controls are of conventional layout.

A figure for weight may not at present be quoted, though it is of some interest to recall that in his paper, *Recent Developments in Flying-boats*, delivered early this year, Mr. Knowler considered a twin-jet fighter of 15,000 lb all-up weight, the structure of which represented 33.4 per cent of the total, the power plant 28.05, and the load 38.55 per cent. With its span of 46ft the A1 is, of course, larger than contemporary land-based jet fighters, and could hardly be expected to engage these successfully in combat.

This promising new British fighter is evidently the result of very close collaboration between airframe and power-plant designers. As an appreciation of this, and in commemoration of the first flight by the first jet-propelled flying-boat, Dr. Smith presented silver tankards to Messrs. Knowler and Tyson. May these be charged before too great a passage of time to celebrate the full flight trials.



Note in this view that the jet tail pipes stand proud of the hull.

NEW TYPES FOR RADLETT

IN addition to the S.R./A1 jet flying boats it is hoped that the following new types of British aircraft may make an appearance at the S.B.A.C. Display at Radlett during September: Airspeed Ambassador; a late mark of Avro Tudor; Blackburn Firecrest; Boulton Paul P.108; Cunliffe-Owen Concordia; Handley-Page Hermes II; Heston A.O.P.; Miles Merchantman; Prestwick Pioneer; Short Sealand; and Westland Wyvern. The Bristol-Hafner 171 and Fairey Gyrodyne are "just possibles."

Advanced Trainer

Boulton Paul P.108 Completes Initial Tests with Mercury Engine

ONE of two British advanced trainer aircraft designed eventually to be powered with a Rolls-Royce Dart or Armstrong Siddeley Mamba airscrew turbine, the Boulton Paul P.108, or Balliol, to give it its official name, has lately completed initial flying trials fitted with a Bristol Mercury radial piston engine, pending availability of a turbine. Suitable for instruction by day or night, gunnery, navigation, bombing or glider towing, and readily adaptable for deck landing, the P.108 is of metal construction. Each mainplane comprises an inner portion, directly attached to the fuselage side by four pin joints, and an outer section similarly attached at about half span. Withdrawal of the two lower joint bolts, through the medium of a latch gear, enables the outer portions to be folded.

The N.A.C.A. 65 aerofoil section selected has its maximum thickness at 40 per cent chord, permitting a two-spar structure forming a torsion box of favourable proportions. Light-alloy T-section extrusions, expanded at the ends to form the lugs for the pin-joint attachments, are used for the spars. The front spar is at 33 per cent chord, allowing for stowage of the undercarriage and dive brakes in the leading-edge, and the rear spar is at 70 per cent chord, allowing ample space between the spars for fuel tanks. Pressed ribs and light stringers reinforce the wing skin.

The forward fuselage section is of light-alloy stressed-skin construction with the exception of the extreme forward part, which is of light alloy and steel tubes. Conventional monocoque construction is employed for the rear fuselage, and two-spar construction is used for the tailplane and fin. The tailplane spars are of folded light alloy sheet.

From the point of view of synthetic instrument-flying, it is claimed that a design has been evolved which gives a very simple and most efficient form of operation and stowage for the two-stage filter scheme. Slides are provided which extend from the top of the windscreen down into the fuselage on the engine side of the instrument panel. The filters for the front panels of the fixed windscreen are normally stowed in the lower portion of the slides and are raised by a pneumatic ram, with a press-button control valve, from the normal air line. Stowage is effected by a spring-return in the ram, released by a press button. The fixed dome of the front windscreen is permanently tinted. Two sliding side filters are provided, covering the front half of the sliding hood. These filters are made to slide into a stowage position in the aft portion of the sliding hood during flight and may be easily removed when not required. The top portion of the hood can be treated in a similar manner as an alternative to permanently tinted panels.

Cockpit heating and ventilation are regulated by a selective control in the cockpit. In the turbine-powered version hot air will be supplied by passing air from the engine air intake through a muff on the jet tail pipe. Cold air is supplied by diverting the intake air direct into the cockpit.

Aft of the cockpit enclosure the fuselage of the P.108 is very slim. Another recognition point is the straight-tapered wing which is cranked outboard of the undercarriage.

HERE AND THERE

BERLIN BOUND: Kenneth C. Royall, the new U.S. War Secretary, called in at Northolt on his way to Berlin. In the group are (L. to R.) Sir Thomas Cash, deputy under secretary of state for war, Kenneth C. Royall, Maj.-Gen. Clayton L. Bissell, Military and Air Attache to the U.S. Embassy and G/C. I. Hodgson, O.B.E., O/C V.I.P. reception.

Air Immigrants Leave

THE first of 7,000 British immigrants to be flown to Canada under the Ontario Air Immigration Scheme (announced in *Flight*, July 10th) were due to leave Croydon airport last Saturday. They were to fly via Newfoundland and land at Malton airport, Toronto. Transocean Airlines is the firm employed to fly the immigrants across the Atlantic.

Hydulignum Again

HORDERN-RICHMOND, LTD., it is announced, has recently changed hands and now has a new board of directors. Edmund Hordern and the Duke of Richmond and Gordon are no longer connected with the company which bears their names. The firm reports activity in the building of Hydulignum compressed-wood blades for main and tail rotors for a helicopter, variable-pitch airscrew blades, fixed-pitch blades for Gipsy and Cirrus engines, and various tools and fixtures for their craft industry. The works are at the old address at Haddenham, Bucks.

INSPECTION! Marshal of the R.A.F. Lord Tedder inspecting a passing out parade at the No. 1 School of Technical Training, R.A.F., Halton, last week. It was the 49th entry to the School and Polish apprentices were among those on parade. A large majority of the Polish youths have volunteered for five years regular service in the R.A.F.

Following the Fashion

EXPERIMENTS are now being made at La Guardia field, New York, with a loudspeaker system over which frequent announcements of aircraft arrivals and departures, and sidelights on aircraft types, capacities, speeds and other relevant facts will be broadcast for the information of people on the spectators' promenade. Public enclosures with similar facilities have now been in operation for some time at Heathrow and Northolt airports.

Airborne Coastguards

THE smuggling of drugs across the Sinai desert and along the Egyptian coast has been worrying the Egyptian authorities for many years. Latest developments in the anti-drug campaign is the announcement that aircraft are to be used by the Egyptian coastguards and that the Ministry of National Defences has approved the purchase of seven aircraft for this task.

Change of Name

VICKERS-ARMSTRONGS have announced that the type name of the V.C.II is to be changed from Viceroy to Viscount. The still air range will be similar to the Viking at 1,700 miles, but the Viscount's cruising speed will be about 325 m.p.h. Prototypes are under construction at Weybridge, but the aircraft will probably not fly on routes until 1950.

The Kemsley Fund

THE Board of Trustees of the Kemsley Flying Trust held their first meeting on July 28th. Following upon this meeting, details of the information required by the trustees when making application for a loan have been circulated to British gliding clubs. Briefly, the purpose for which loans will be made is for the provision of capital assets which include: (a) sites and airfields of proved suitability for the purpose for which they are intended; (b) storage and maintenance accommodation for aircraft and equipment; (c) aircraft and major equipment necessary for their operation, and (d) club house accommodation. The secretary of the trustees is Lord Kemsley's representative Mr. B. Meads, whose services are available to clubs for the purpose of advice and general assistance in preparing claims.

Medallist

AT a model show in the Percival field day held recently, Mr. R. O. Jones won a medal for craftsmanship with his exhibition of an adaptable clamp. The medal was presented by Mr. W. A. Summers, managing director of Hunting Aviation Management, Ltd. Mr. Jones is an apprentice in the experimental workshop at Percival Aircraft, Ltd.

Garden Party

THE Reading and district branch of the Royal Aeronautical Society will hold its annual aeronautical garden party at Woodley airfield, Reading, on Saturday, September 6th, at 2.30 p.m. Aircraft service and fuel will be available to those arriving by air. A limited number of tickets at 5s each, including tea and car or aircraft park, are available to members of the Society.

Gliding in the Engadine Alps

THE International Engadine Gliding Week started at Samedan on July 30th and will continue until August 9th. In 1945 the record figure of 2,534 flying hours for a total of 2,738 starts at this venue, exceeded by over eight times the annual average for Switzerland, and flights attaining altitudes of over 7,000ft above the start were almost a daily occurrence.

The altitude-flying competitions, target races and circular races promise keen struggles for position in the various classifications. Several countries are participating, and it is known that at least twenty gliders will take part in the great Engadine circular flight, the "Tour de la Bernina."

Low-Level Attack

FOR three days recently a specially equipped helicopter sprayed white clouds of Gesarol powder over the oak forest and fruit gardens of Visingö, an island in Lake Vättern, Sweden. The spraying of Gesarol, a D.D.T. preparation, was undertaken in an effort to exterminate voracious larvæ which have

HERE AND THERE

been ravaging the vegetation for eight years. Twenty experts, headed by Professor Viktor Butovitsch of the Swedish Government Institute of Forest Research, attended the experiment, which is reported as being successful. This is the first time vermin have been attacked from the air in Sweden.

Mission Transport

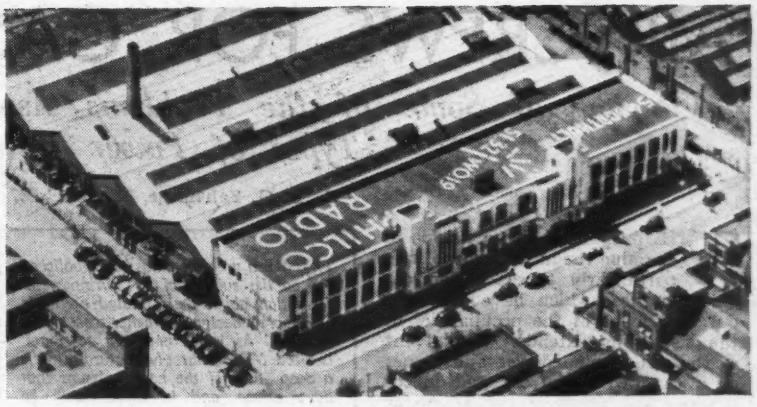
THE Missionary Aviation Fellowship, which aims at "speeding world evangelization" was due to receive its first aircraft at the end of July. The machine, a Miles Gemini, is to be used primarily to carry out a visit to some hundred and ten mission stations in East Africa to discover how mission work can be better carried on by using aircraft. Before leaving for Africa, the Gemini will be taken for a short tour of the larger cities in the U.K. when people interested in the missionary aspect of aviation will have an opportunity of seeing the aircraft and hearing about the work it is to do.

Extended Activities

THE FAIREY AVIATION COMPANY announce that the repair, maintenance, modification and overhaul activities of the company have now become what is virtually a "secondary industry." In progress now, or recently completed, are contracts for the repair and maintenance of large numbers of aircraft. Numerically, the biggest contract in progress at this date is the conversion to Turkish requirements of de Havilland Mosquitoes at Ringway.

Encore

THE "Reynolds Bombshell," the converted Douglas A-26 Invader which made a round-the-world flight last April in 78 hr 55 min, was due to take off from Chicago last Sunday on another globe-encircling flight. Mr. William O'Dom, pilot of the machine, was hoping to complete the journey with only five stops. Mr. Milton Reynolds, millionaire pen manufacturer, who owns the "Reynolds Bombshell," had to abandon a proposed flight over the South Pole recently owing to lack of airfield facilities.



POINTING THE WAY: This pin-point sign recently painted on the roof of the Philco Radio factory at Perivale gives the position of the factory and shows the direction and mileage to Northolt Airport. The sign has the full approval of the M.C.A.

Short-Sighted

TWENTY-SEVEN R.A.F. bomb sights, which are estimated to have cost about £14,000 to produce, were recently bought for £25 by a Belfast dealer at an auction of surplus stores at Toome, County Antrim. The sale was a mistake, and when the sights were missed the R.A.F. authorities got to work to trace them. Negotiations for the return of the sights have been proceeding between the buyer and the Air Ministry.

Jets for Southend

JET Meteors and Vampires, giving a display of high-speed flying and aerobatics, are to join in the international air rally and air races which will mark the official re-opening of the Southend Municipal Airport on August 9th. Other attractions being shown include parachute jumps, sailplane aerobatics, and formation-flying by a flight of the latest type of Spitfire. Details of the rally programme were published in *Flight* of July 17th.

Figured Out

DESPITE the general trend of the American light aircraft market to ease up on production, the Piper Aircraft Corporation announces that proportionately slightly more Piper aircraft have been exported this year than during 1946. In that year 632 Piper Cubs, or 8 per cent of the 7,780 delivered, were sent abroad, whereas during the first five months of 1947, 233, or 9 per cent of the 2,587 delivered, were sent overseas. The Corporation also states that its sales during the first eight months of its current fiscal year (up to June 1st) have been greater than in any previous complete fiscal year, including the war years. According to reports from eleven manufacturers of the Personal Aircraft Council and the Aircraft Industries Association, the production of private aircraft in America during the first six months of this year totalled 10,697, valued at $33,976,000.

FOR INSTRUCTION: Following the trials of the Prentice prototype, now almost completed, a considerable number of the pre-production models are now under construction and will shortly be available to the R.A.F.

News in Brief

TWO hundred men of the R.A.A.F. are engaged on constructing an air strip at Woomera, in South Australia, for use in the rocket range project.

* * *

The U.S. Army Air Forces' air weather service is planning to start a daily weather-observation flight to the North Pole. The flights are expected to begin by the end of July.

* * *

Three large hangars which have been estimated as costing £15,375 are to be erected at Colombo airport.

* * *

Mr. Leslie Gamage, M.C., joint managing director of the General Electric Co., Ltd., and who was recently appointed Chief Business Adviser to the M.C.A., has been re-elected chairman of the British Export Trade Research Organization for the ensuing year. Sir Percy Lister, of R. A. Lister and Co., Ltd., is succeeded as deputy chairman by Mr. John Ryan, M.C., of the Metal Box Co., Ltd.

* * *

The Ministry of Civil Aviation *Notice to Airmen* No. 209 warns pilots that on account of the International Air Rally the Southend Municipal Airport, Rochford, 51° 34′ N., 00° 42′ E., will be closed to all traffic between the hours of 1000 and 1630 G.M.T. on Saturday, August 9th, 1947. Pilots not taking part in the rally are advised to avoid flying within five miles of the airfield on the above date between the hours stated.

AIRSCREWS FOR GAS TURBINES

A Review of Some of the Problems Associated with the New Types of Power Unit

By L. G. Fairhurst, M.I.Mech.E.

WHILE a great deal has been published on the subject of gas turbines, information about their related problems of airscrew design has hitherto been very meagre. As chief engineer to Rotol, Limited, Mr. Fairhurst has naturally made a deep study of the new problems that have arisen, and in these notes he examines the precautions that have to be taken, notably in connection with the prevention of overspeeding when airscrews are used as brakes.

THE purpose of this article is to examine the airscrew problems, particularly those of a mechanical nature, which have arisen as our knowledge of the peculiarities of the gas turbine extends. The advent of the gas turbine power unit comes at a time when current and future airscrew specifications are calling for operation in reverse pitch as a landing brake for multi-engined aircraft, and in windmilling pitch for dive-braking in naval aircraft. As these braking features play a considerable part in modifying the airscrew basic design, the associated problems are dealt with at length.

Although these notes are solely concerned with airscrew turbines, it may be of interest to the reader to record that the limit in horse power to which the conventional piston engine will be taken seems now to be accepted as 3,500/4,000 h.p. Engines such as the Rolls-Royce Eagle, Bristol Centaurus and Napier Sabre have potential developments of this order. It is almost certain, therefore, that these engines are the last of their kind, and that no new basic types will be embarked upon. For powers beyond this, the gas turbine undoubtedly has a clear field. It may even be that the piston engine will call a halt at 3,500 h.p; this, however, depends on the rate at which gas turbine development proceeds. That the 3,500 h.p. piston engine will find a place in naval aircraft for the next three to four years is certain, but it is doubtful whether civil or military transport aircraft will utilize single power units in excess of 3,000 h.p. Airscrews for such engines have four blades on the larger civil and transport types, where ample diameter is available, but six- or eight-blade contra-rotating types are used for naval aircraft.

The basic types of airscrew turbines are shown in Figures 1, 2 and 3. They are as follows:

Direct-connected type, wherein the compressor, turbine and airscrew are directly coupled to a common shaft driving the airscrew through a reduction gear.

Compounded-compressor type, wherein there are two compressors and two turbines, the high-pressure compressor being directly coupled to and driven by the high-pressure turbine, and the low-pressure compressor being directly coupled to and driven by the low-pressure turbine, independently of the high-pressure unit.

Free-turbine type, wherein the whole of the compressor system is driven by one or more directly-connected turbines, the airscrew being driven by a further turbine solely "gas connected" to the latter system. The airscrew turbine is, therefore, mechanically isolated from the compressor turbine unit.

Each of these types possesses individual features which impose differing conditions on the airscrew. The

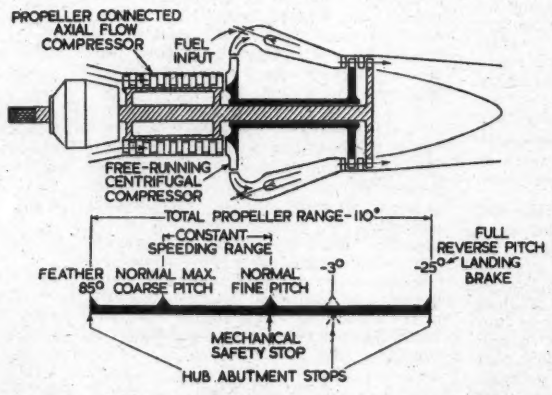


Fig. 2. Compounded-compressor turbine system. The first-stage turbine (shaded) drives the free centrifugal compressor. The second-stage turbine (black) drives the airscrew and the axial-flow compressor.

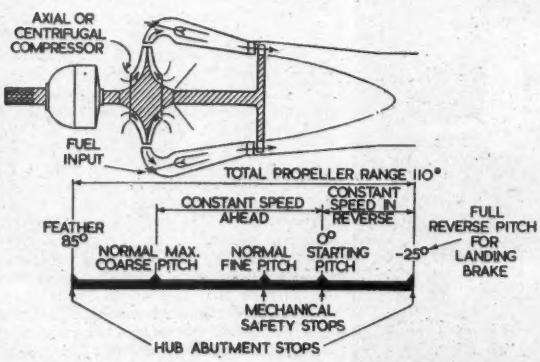


Fig. 1. Direct connected turbine system. The turbine drives both the airscrew and the compressor. If dive-braking is used, the Odeg. mechanical safety stop becomes the hub abutment stop, and a compromise angle serves for both starting and windmilling pitch.

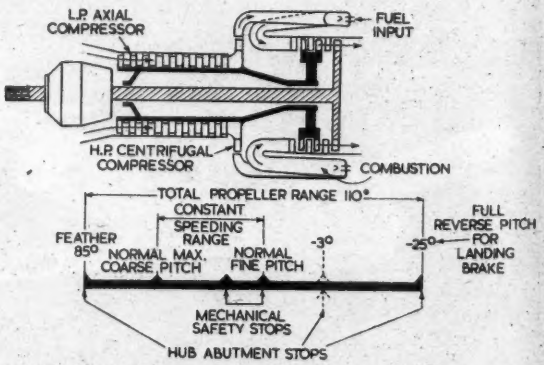


Fig. 3. Free-turbine system. The first and second turbine stages (black) drive the free compressor system. The third turbine stage (shaded) drives the airscrew only. The -3deg. hub abutment stop occurs only when the dive-braking is used instead of full reverse for landing brake.

Airscrews for Gas Turbines . . . . . .

direct-connected type requires an airscrew with provision for a superfine pitch (approximately zero) in order to ensure easy initial starting of the engine, maintain suitable idling conditions, and allow quick acceleration of the engine up to maximum r.p.m. Further, the extra range afforded by allowing the airscrew to constant-speed at the superfine angle prevents the serious situation arising of the engine stalling when coming in to land.

Further addition to the airscrew system is required in the provision of a mechanical safety stop at an appropriate safe positive pitch which will prevent the blades inadvertently moving into superfine pitch should an airscrew control system failure occur in normal flight. At

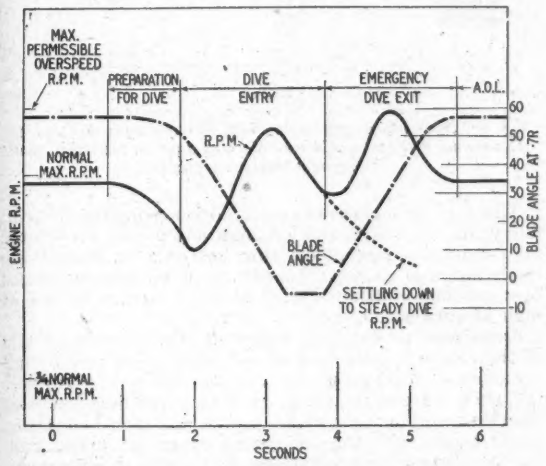


Fig. 4. Direct-connected turbine engine with airscrew as a dive brake. The normal dive exit would take place at a later period than that shown for the emergency condition, which is indicated merely to show that exit must not occur before this point.

the same time, flight will be sustained in the new fixed pitch. Without such a stop, the airscrew and engine would violently overspeed beyond permissible limits, with the most serious consequences. In the case of exceptionally high-speed aircraft, consideration will have to be given to providing a further safety stop at some angle coarser than normal take-off fine in order to prevent serious overspeeding if control system failure should occur at this high speed. The system is designed to enable the safety stops to be overridden where necessary when coming in to land.

For airscrews using negative pitch as a landing brake it is essential, in order to prevent overloading the engine under low-power running conditions, to have the airscrew under constant-speed control right through to negative pitch. This latter feature adds a requirement to the airscrew system by having to incorporate automatic change-over valves to reverse the sense of the pressure-oil supply and permit constant speeding in negative pitch. Additionally, a second mechanical safety stop is provided at the starting superfine pitch to prevent the airscrew inadvertently moving through this pitch and into reverse in the event of control system failure. If, when coming in to land, such a condition occurs while the aircraft is still airborne, the heavy reverse pitch would stall the engine and undoubtedly incur serious consequences. Means are again provided deliberately to override this stop when applying reverse pitch at touchdown as a landing brake.

In the event of this type of engine being used in a dive-bombing aircraft where the airscrew is employed as a dive brake, braking provision has to be made for a blade angle of approximately −3 deg, this angle being the condition at which the airscrew develops sufficient windmilling torque to rotate the engine (power off) at an r.p.m. which, combined with the forward speed in the dive and blade angle incidence, will produce the required drag. In changing pitch from the fine angle to the dive-brake angle and *vice versa*, the blades pass through a pitch range in which the airscrew develops a torque sufficiently great to accelerate the engine to high r.p.m. This period of pitch change must, therefore, be moved through with great rapidity and demands a pitch-change rate of about 40 deg/sec. The speed to which the engine can be accelerated depends on the inertia of the system; the direct-connected turbine possesses the highest inertia and motoring power of the engine parts mechanically connected to the airscrew and, hence, the least tendency to overspeeding.

Emergency Dive Recovery

At the point of dive entry (see Fig. 4) the engine r.p.m. will surge instantaneously to a value within predetermined acceptable limits, but will quickly decrease—taking about two seconds—to a steady figure as the dive progresses. It is essential to allow this period of two seconds to elapse before any attempt at dive exit is made, otherwise the r.p.m. will not have settled down to a sufficiently low figure to prevent overspeeding when coming out of braking pitch. In addition, a delay of approximately 1½ seconds is necessary, even after the steady dive r.p.m. has been obtained, before the power lever is moved out of braking pitch and into the normal forward flight power-on position. This 1½ seconds' pause is to ensure that the fuel feed is not reopened until the airscrew pitch has reached the normal flight condition. To achieve this, it is necessary to include some form of dashpot in the airscrew control system. The foregoing is only concerned with emergency recovery; in a normal dive the period is usually long enough to allow the r.p.m. to settle down to steady dive conditions before recovery has to take place. Figure 4 also shows the progressive change in blade angle from the dive entry and exit.

The compounded-compressor type of turbine functions, so far as the airscrew is concerned, very much on the lines of a piston engine inasmuch as no superfine pitch is required for starting or idling. Neither is constant-speeding in reverse pitch required, as the engine cannot wholly stall under low-pressure running conditions since the com-

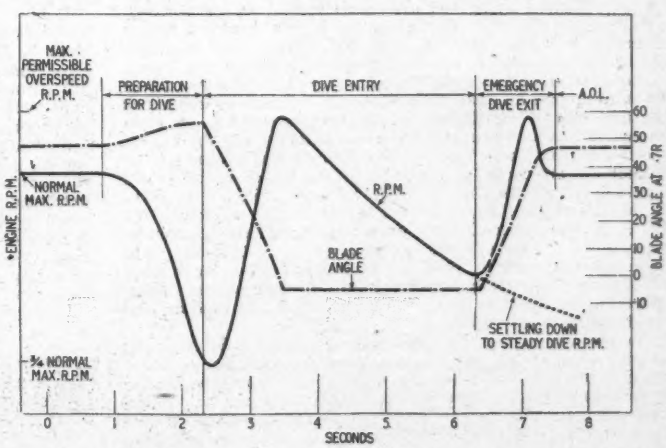


Fig. 5. Compounded-compressor type turbine engine with airscrew as dive brake. The normal dive exit would take place at a later period than shown for the emergency dive exit, which condition is merely to show that exit must not occur before this point.

Airscrews for Gas Turbines . . . . .

pressor-turbine system is entirely separate from the airscrew-turbine-compressor system. With landing-brake airscrews in negative pitch it is essential to provide a mechanical safety stop at normal fine pitch, and for exceptionally high forward speeds a further mechanical stop is necessary at a still coarser pitch.

Should this type of engine be used in a dive-bombing aircraft with the airscrew employed as a dive brake, the rate of pitch change will have to be increased to about 50 deg/second to prevent overspeeding beyond the permissible limits, due to the reduced inertia in the engine system as compared with the direct-connected type. Furthermore, it will take approximately four seconds before the steady dive r.p.m. is attained (see Fig. 5), i.e., double that of the direct-connected type, with an additional 1¼ seconds' delay at this steady condition before moving the control to unbrake and opening up the fuel supply. Here again, mechanical safety stops are essential, as for the landing-brake airscrews. Figure 5 also shows the progressive change in blade angle from the dive entry and exit.

The free-turbine type, from the aspect of airscrew control, functions on piston engine lines, and a system of mechanical safety stops, as for the compounded-compressor type, is necessary. If, at any time, this power unit is considered for a dive-bombing aircraft, and the airscrew is used as a dive brake, the rate of pitch change will have to be increased substantially over those for the other two types considered. So far as dive entry alone is concerned, the rate need be increased only to about 70 deg/second to keep the dive-entry peak r.p.m. within the permissible limits. However, a peculiarity of this engine is that, due to the low inertia of the system, there is no appreciable fall-off in engine r.p.m. after the peak at dive entry has been passed (see Fig. 6), and, as such, the r.p.m. surge at dive exit is practically a direct addition to the dive-entry peak r.p.m. Due to this addition, it becomes essential to increase the rate of pitch change in order to keep the total r.p.m. surge within permissible limits, the resulting rate being approximately 130 deg/second. Figure 6 also shows the progressive change in blade angle from the dive entry and exit.

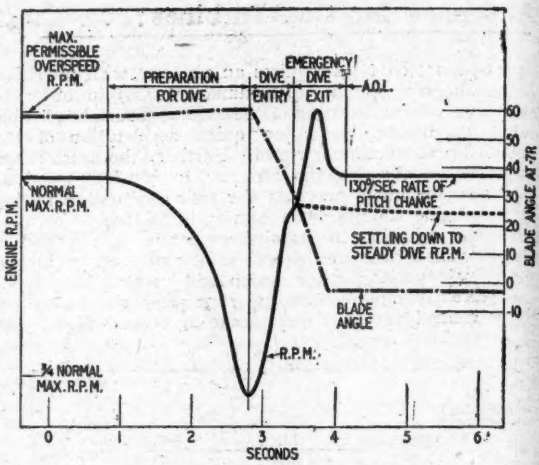


Fig. 6. Free-turbine type engine with airscrew as a dive brake. The normal dive exit would take place at a period later than that shown for emergency dive exit.

This type of engine—in almost all kinds of aircraft—will, due to its low inertia and low motoring power, most probably require a mechanical stop not only at normal fine pitch but also at some coarser pitch to prevent serious overspeeding in the event of airscrew system failure at high forward speed.

Experience to date has indicated that inter-connection of the airscrew speed control with the engine fuel control is almost essential for the direct-connected type of turbine, the main purpose being to prevent a running condition wherein a combination of low r.p.m. and high fuel setting might occur, with the concurrent danger of engine stall. On the compounded-compressor and free-turbine systems, the interconnection is not so essential, since the airscrew system is, in the former case partly and in the latter case wholly, a separate unit.

(*To be continued next week.*)

617's ATLANTIC CROSSING

THE first direct crossing of the Atlantic from East to West by a bomber squadron was completed by 16 Avro Lincoln IIs of No. 617 Squadron, R.A.F., on Wednesday, July 23rd. Remarkably enough the weather did everything to help. The take-off was in ideal conditions and the only difficult patch of the weather was encountered over Ireland, involving a certain amount of blind flying and even mild icing. At the briefing, conditions at Gander were given as highly doubtful and a diversion to Goose Bay was covered. When the Squadron reached Newfoundland, however, they found perfect conditions.

For control purposes the Lincolns flew individually, taking off at 10-minute intervals from Binbrook. Prestwick controlled the first half of the flight, and Gander the second. A great circle course was flown of 2,020 nautical miles, and the briefed speed was 165 knots I.A.S. The aircraft flew alternately at 8,000ft and 10,000ft, and thanks to the better winds at the higher level, the second aircraft, L. Love, piloted by F/L. A. H. Crowe, D.F.C., with the leader of the mission, G/C. W. P. J. Thompson, D.F.C., on board, landed first at Gander after a flight of 11 hours 20 minutes from take-off. The Squadron Commander, W/C. C. D. Milne, D.F.C., in A Abel, which had taken off first, came in shortly afterwards. Take-offs occupied the time from 0800 hr, D.B.S.T., to 1030 hr, and the landings from 1930 D.B.S.T., to 2148 hr.

On the way across the crews had hoped for a fix from the weather ship, C Charlie at 32 deg West, but only one operator made contact, only to learn that the ship had moved off station to take an emergency case of appendicitis back to port. Loran was the main aid for the 2,000-mile ocean crossing. It had been expected that there would be a gap of 400 to 500 miles in the middle of the crossing, but this never exceeded 250 miles, and in two cases aircraft had Loran coverage the whole way across. Consul was found most satisfactory, and was still being picked up within sight of Gander, but was not used beyond 40 deg West. Radio range was picked up 350 miles out from Newfoundland, but the Squadron, like civilian operators on the same day, had a dead area on the W/T over a distance of approximately 800 miles. A similar phenomenon had been met with in 1928, and is possibly attributable to the sun spots. H2S Mk 3 gave its usual assistance at either end of the journey.

L Love—the first across—was one of the two aircraft that had difficulty with their wireless equipment, and the navigator, F/L. E. G. Crowley, relied a great deal on his sextant in the astro dome. That he, like every other navigator, made landfall within four miles of his flight plan, speaks well for the hard work the navigators put in. None had previously navigated on an Atlantic crossing.

The Squadron having lined up their Lincolns at the side of one of the asphalt immensities at Gander, went off to enjoy the four hours they had captured by the crossing. They were welcomed at Gander on behalf of the Newfoundland Government by Mr. H. A. L. Pattison, Director of Civil Aviation. A cable of congratulation to all crews arrived from the A.O.C. in C., Bomber Command, Air Marshal Sir Hugh Saunders, on Thursday morning, while they were in the process of getting their aircraft ready for the journey down to Washington.

"FLIGHT" PHOTOGRAPHS

OWING to the additional cost of materials, it has been necessary to increase the prices of *Flight's* photographic prints As from August 4th our prices will be as follows:—

	Glossy or semi-matt	Toned Sepia
	s d	s d
6×4in	2 0	3 3
8×6in	3 0	4 9
10×8in	4 0	6 3
12×10in	5 0	8 0
15×12in	8 6	11 0
20×16in	11 6	15 0

Aircrew Selection

Sorting Wheat from Chaff in Candidate Aptitude Tests

AT R.A.F. Station North Weald, which during the Battle of Britain was one of the front-line fighter bases, has now been established the Combined Selection Board whereby candidates for aircrew are assessed as to their aptitude. Everything is done to put the entrants at their ease and to ensure that they enter the undertaking with a clear picture in their minds as to exactly what is entailed. The R.A.F. itself is only too keen that each candidate should be given every opportunity to make the best of himself; it is patently in the interests of the Service that this should be so.

There is no question of submitting the entrants to an examination and trying to catch them out. The whole system is designed to assess—on as scientific a basis as possible—the natural aptitude of the individual for the type of work he wishes to do. The aim of preliminary aptitude testing is to do the selection in a way that is far more accurate than is possible by interview. In this connection it is officially stated that, during 1940-41, of those selected by interview for pilot duty, fully a quarter failed in training through lack of flying ability alone.

The tests are divided basically into two kinds, written and apparatus, but the "score" for all is assessed and used as the final index of the candidate's aptitude. Individual scores do, however, indicate a particular bent in one direction or another. In the light of this we were interested to hear that if, for example, a candidate wishes to become a pilot and his test results show he is very likely to become a good pilot but, on the other hand, is also likely to become a first-rate engineer, there is no persuasion put upon the entrant to make him choose an engineer's job instead. On the contrary, if his main interest and desire is to become a pilot he is given every encouragement. Personal interest in the job plays as important a part (so far as the Service is concerned) as does execution of the job—given conformity with a basic standard.

There are three pencil-and-paper tests (which originated with the U.S.A.A.F.), all of which are objectively arranged with several alternative answers shown for each question. The candidate must select the answer which he thinks is correct or most nearly correct. Each test aims at assessing the candidate for a different interest or knowledge: one covers familiarity with elementary aviation activities; another measures speed and accuracy in interpreting instruments; and a third assesses general mechanical bent and practical interests. There are further papers, for navigators and engineer candidates, which aim at assessing respectively mathematical ability and mechanical comprehension.

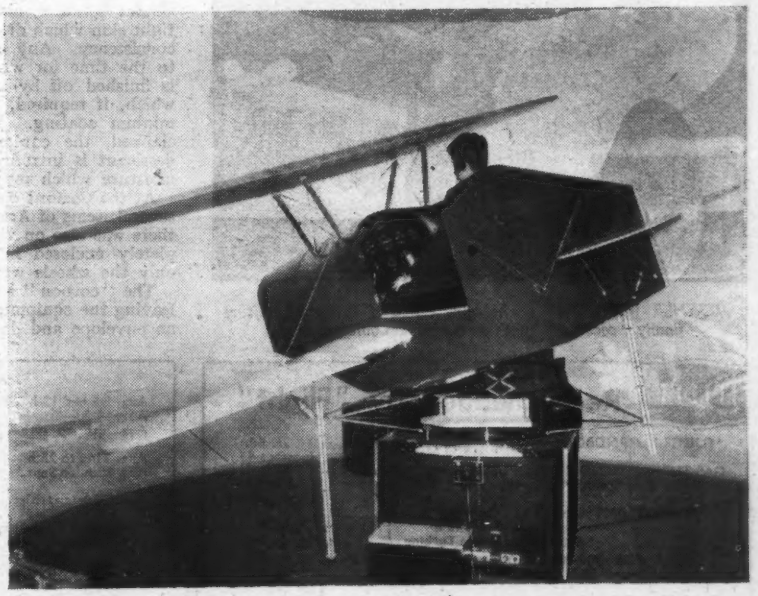
Sensori-motor Tests

All of these tests have in common an eminently clear introductory explanation—which is amplified by the tester in charge—with sample problems, and each paper gets progressively stiffer as one goes through it. The times allowed for answering naturally differ a great deal according to the papers but, on the whole, we felt, were amply generous. Whilst the candidate is coping with his paper, invigilators who are trained to move silently pass among the tables to offer any help required without actually solving the candidate's test problem. They also prevent any skulduggery should such a beast rear its ugly head. They do walk *very* quietly.

Complementing the paper tests are apparatus tests for assessing (a) hand/eye/foot co-ordination and (b) hand/eye/velocity co-ordination. The first of these takes the form of a "cockpit" complete with stick, rudder pedals and throttle, and with a large glass screen fronting the "pilot" candidate. On this screen appears a dot of light which is controlled in its vertical movement by "elevator" movement of the control column, and in its horizontal motion by movement of the rudder pedals. The machine is set running, and the dot of light starts shifting about all over the screen.

Co-ordination of hand/eye/foot control is measured by a sensori-motor apparatus which automatically counts the candidates "score."

It is the "pilot's" job so to manipulate his controls that the light is kept within a square of about 2-inch sides, engraved in the centre of the screen. Below the screen is a white and a red light. One or other of these flash on at irregular intervals—not necessarily in sequence—and appropriate movement of the throttle switches them out. The score is counted as the number of seconds the candidate allows the dot of light



Pilot-duty candidates receive three ½-hour test periods on the Visual Link in a cyclorama chamber.

Aircrew Selection . . . . .

Hand/eye/velocity co-ordination is assessed by a rotating drum mechanism which requires motor anticipation for success.

to escape his control and move outside the central square during the 90 sec test run.

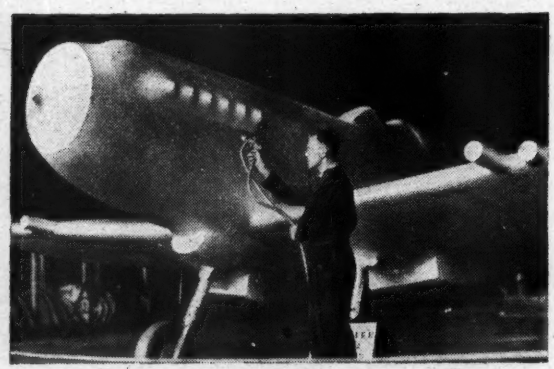
The second apparatus consists of a drum covered with ivorine through which are punched a series of holes in an irregular spiral. A bronze ball contact moving sideways along a rail is remotely controlled by the candidate by a rotatable disc to his left. The aim is to make the ball hit as many of the punched holes as possible whilst traversing the wavering spiral path from left to right. Each "hit" is registered by an electric counter. The controlling disc operates through an integrating gear so that motor anticipation is essential. Rapid movement at the last moment causes delayed overshooting. This test was originated and developed by the Department of Psychology, Cambridge University, which department also collaborated—with the R.A.F. Medical Services—in developing the first-mentioned hand/eye/foot test apparatus.

Lastly, candidates—for pilot duty only—take another co-ordination test which, incidentally, is very good fun. It is the Visual Link. This is a modified Link Trainer set in the centre of a strikingly realistically painted cyclorama—a circular room the walls and skirting of which are painted to represent a cloud/land/seascape as seen from about 2,000ft. A flying boat, a lighthouse and a battleship represent three clearly defined targets at which the "pilot" can aim his "aircraft" and which he can use as reference points in executing the instructor's orders. Each pilot candidate gets three half-hour periods on the Visual Link, one period only in a half-day so that by spreading the three half-hours over a day and a half, recovery from fatigue is possible for the candidate and, therefore, a reliable sample of his performance may be obtained.

There are seven selection boards at North Weald, the Commandant being W/C. M. P. Thompson, and the maximum flow rate of candidates through the boards varies between 200-250 at any one time. The entry examined are for (i) aircrew; (ii) Cranwell cadets; (iii) glider pilots; (iv) apprentices (admin. and aircrew); and (v) boy entrants. The tests we have reviewed are those given to aircrew and Cranwell candidates.

"COCOONING"

AN American method of protecting aircraft, engines and components (or, in fact, any kind of equipment) for shipment or storage has been introduced to this country and was demonstrated recently to Admiralty, War Office and Air Ministry representatives at No. 9 M.U., Cosford. The demonstration was organized by the Ministry of Supply in conjunction with R. A. Brand and Co., Ltd. (Ormonde House, 26, St. James's Street, London, S.W.1), who have acquired the British rights from the American sponsors, Butler and Co., Inc., Philadelphia.



WEATHER-PROTECTED: The appearance of a Mk.22 Spitfire finally "cocooned" with an aluminium outer coating.

Aptly known as "cocooning," the process consists of winding a few criss-cross turns of tape round the article (though this may not be necessary in the case of equipment with a smooth surface, such as a complete aircraft) to provide a framework on to which a cobweb-like coating of a vinyl-resinous compound is then sprayed with an ordinary paint-spray gun. This in turn provides a basis for a somewhat similar solution, also applied by spray until it forms an air-tight skin which dries almost immediately to a tough, leathery consistency. Any number of coats can be applied, according to the time for which protection is required, and the work is finished off by an outer coat of a bituminous compound which, if required, can be finally covered by a sprayed aluminium coating. With full protection of this kind, it is claimed, the equipment is weatherproof for ten years. A dessicant is introduced inside the "cocoon" to absorb any moisture which may be present in the original air.

At the Cosford demonstration, "cocooning" was applied to several items of Army equipment and to a Merlin XXIV, and there was also on view a Mk. 22 Spitfire which had been completely enclosed in a tight-fitting bitumen-aluminium skin; only the wheels were left exposed.

The "cocoon" is removed by cutting away and tearing off, leaving the equipment quite clean, as the coating merely forms an envelope and does not stick.

ILIFFE TECHNICAL BOOKS

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"FLIGHT" HANDBOOK	4th edition	7s. 6d. (postage 4d.)
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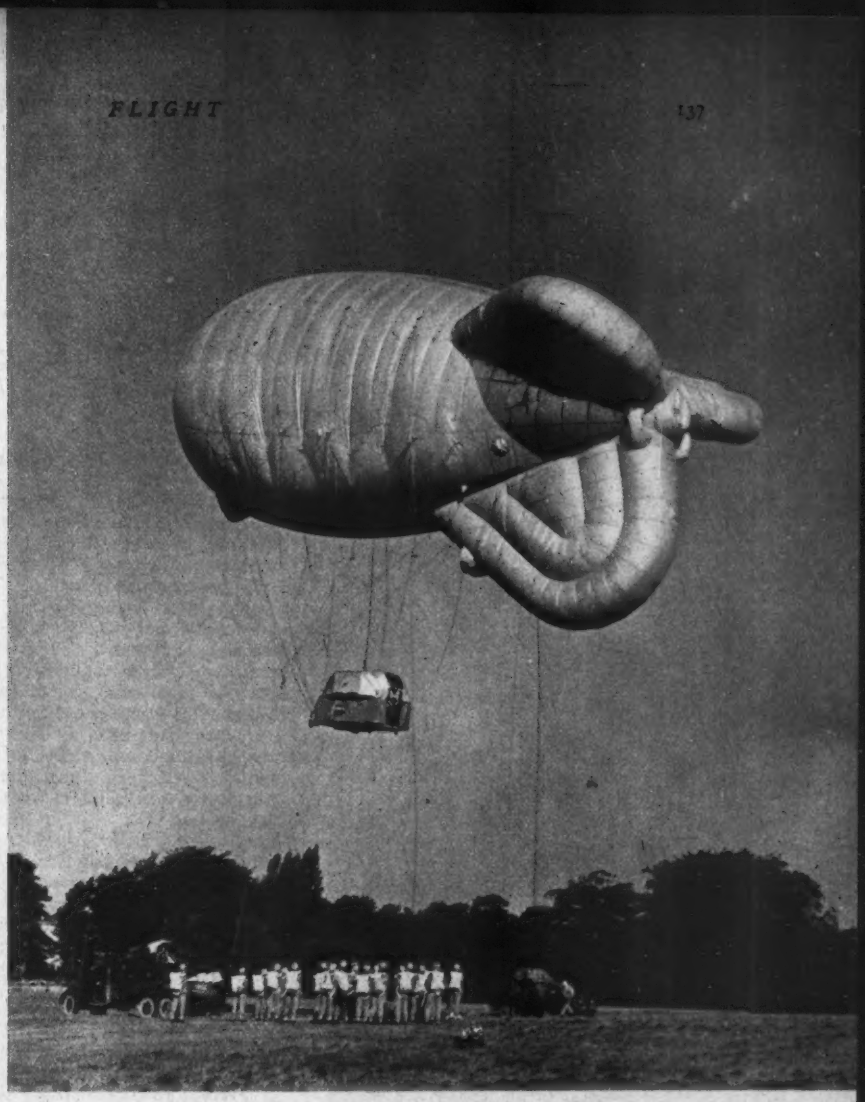
TURBINES FOR AIRCRAFT (4-page colour leaflet reprinted from "Flight")		6d. (postage 1½d.)

From all leading booksellers or from Iliffe & Sons Ltd., Dorset House, Stamford Street, London, S.E.1.

FORTHCOMING EVENTS.

Aug. 9th and 10th.—Southend flying meeting.
Aug. 16th.—Strathtay Aero Club: Perth air display.
Aug. 20th. to 29th.—Twenty-Second Model Engineer Exhibition. New Royal Horticultural Hall, Vincent Sq., S.W.1.
Aug. 22nd to 25th.—Norwegian Aero Club: Air rally, Tönsberg, near Oslo.
Aug. 28th. to Sept. 13th.—Engineering and Marine exhibition. Olympia, London.
Aug. 30th and 31st.—Cinque Ports Flying Club Folkestone Air Races meeting. Lympne airport.
Sept. 3rd to 6th.—Royal Aeronautical Society: Aeronautical Congress.
Sept. 6th.—Naval Aviation: Air display and static exhibition. Lossiemouth air station, Moray, Scotland.
Sept. 6th.—Air Display at R.N.A.S. Yeovilton.
Sept. 9th to 12th.—S.B.A.C. Exhibition and Display.
Sept. 14th.—Royal Aeronautical Society: Garden Party, Radlett airfield.
Sept. 17th to 19th.—Federation Aeronautique Internationale: Annual General Conference, Geneva.



The type of kite balloon and car used for training parachutists. They were about twice the cubic capacity of a normal barrage balloon.

Prelude to GLORY

FOLLOWING a brief review we present the first instalment of Group Captain Maurice Newnham's new book *Prelude to Glory*, which is to be published by Sampson Low, Marston and Co., Ltd. The fascinating and intimate story is that of the creation of Britain's parachute army as seen by the man who commanded the Parachute Training School.

IF there is any formula for the successful fashioning of a British weapon it is a late start and early setbacks. Certainly these factors conditioned the evolution of mass parachuting and glider transport for military purposes in this country. Like so many other arms and military techniques, parachuting and the use of gliders had their origin in foreign practice, but their sound development and glorious fruition sprang from British determination and courage. Of this G/C. Newnham's book eliminates all possibility of doubt.

The creation, training and utilization of Britain's parachute army, with which his glowing story is concerned, called for men of supreme resolution, not only to fly the aircraft and to drop into battle from the air, but to wring the utmost benefit from meagre resources, to secure the means of expansion, and to instil their spirit into others. This is admirably brought out by G/C. Newnham in his account of Mr. Churchill's visit to the parachute training school at Ringway on a bleak Saturday in April, 1941. The Prime Minister had come to see for himself what progress had been made in the development of a policy which he had advocated, against strong opposition, nearly a year before. For this important occasion five Whitleys had been mustered, each fitted to take eight parachutists. Came the moment for take-off, and to the microphone W/C. Sir Nigel Norman addressed the enquiry, "Hallo, formation leader—are you ready to take off?" After a moment's pause the reply came back, loud enough for all to hear—"No, I am not ready to take off—five of the b——s have fainted." The bodies having been removed, the formation duly took off for its historic demonstration.

Meantime, writes G/C. Newnham, "Harvey, Norman, Strange and Rock lost no time in expounding their views, their confidences and their difficulties to a sympathetic

G/C. Maurice Newnham.

Prelude to Glory . . . . .

Jumping with kitbags containing weapons and supplies was condemned by theorists as unsafe. R.A.F. instructors, however, proved it to be practical.

PARACHUTING AND FLIGHT POSITIONS (Left) No
(Centre) *Checking oscillation, strong forward drift.* (Right) Checking

Prime Minister. Whatever their private differences may have been, this was just the opportunity they had been wanting, and they intended to make the most of it—come what might." Keen supporter of the airborne policy though he was, even Air Marshal Sir Arthur Barrett is reported to have shown some apprehension as to what amount of line-shooting was going on!

This, then, was the start: five unsuitable aircraft; forty parachutists of whom six failed to jump; a total fighting strength of less than four hundred semi-trained paratroops; and five single-seat gliders, which had been used before the war by amateurs, constituted the force on which Mr. Churchill had to base his future airborne policy.

A large part of G/C. Newnham's book is a diagnosis of the growing-pains of the Parachute Training School, command of which was entrusted to him in July, 1941. Many are the red-blooded characters he introduces, many the laughs and laments, but few the laurels—until Bruneval and the North African fighting. The latter was happily attended by an increase in the confidence of the Army in the value of parachute troops—this despite inferior technical equipment.

Though his account is largely in the nature of a personal narrative, the author gives due attention to tactical, strategical and technical considerations. His faith in the parachute army remained unquenched throughout the trying years of development; even so, he hesitates to prophesy whether history will credit British and American parachute troops with an outstanding contribution to the shortening of the war and the saving of lives.

Prelude to Glory is such an outstandingly interesting record of stirring achievement that *Flight* has arranged to publish in this and the following issues selected extracts. The chapter herewith will speak for the quality of the book.

H. F. K.

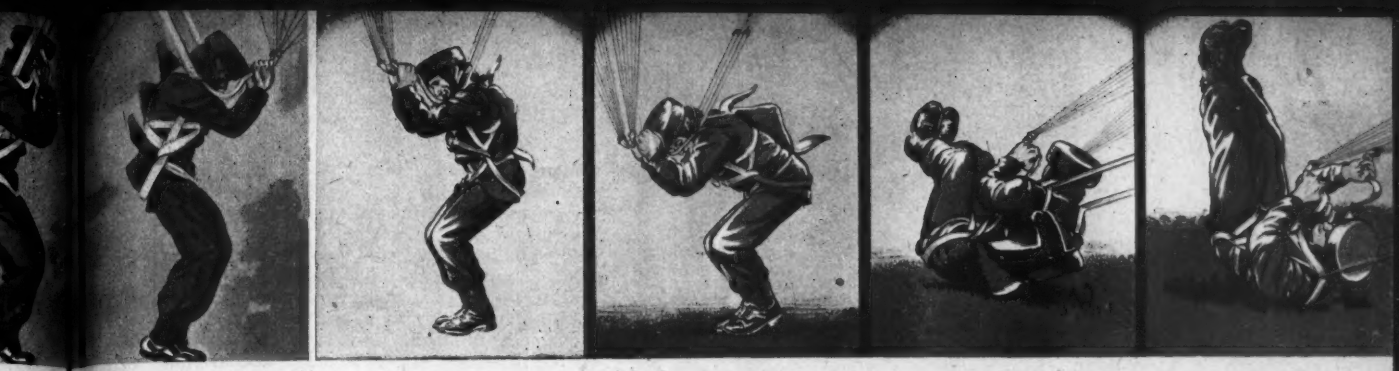
CHAPTER 52

GERMAINE LANDS ON HIS BACKSIDE AND THEREBY RENDERS A NOTABLE SERVICE TO BRITISH MILITARY PARACHUTING

IF Germaine hadn't landed heavily on his backside and then bumped his head he might never have written his memorandum on the evil effects of parachute oscillation, and the development of British military parachuting technique might have followed a very different course. But, fortunately, if the victim will forgive my saying so, these events did happen and they were instrumental in

The standard bag into which a soldier's parachute was stowed. The three illustrations below show how a rigging line could get caught in the retaining loops.

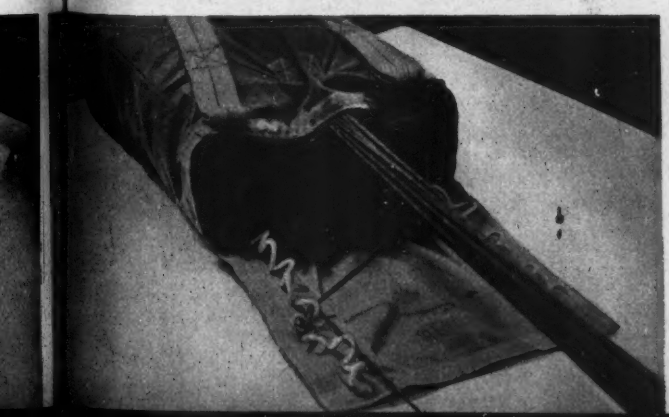
A PERFECT LANDING



ITIONS : (Left) Normal parachuting attitude.
rift. (Right) ...king oscillation, backward drift.

BACKWARD LANDING : *The feet reaching back, take part of the landing shock and the act of pulling down on the forward lift webs provides a support.*

RFECT LANDING. *The legs are pressed tightly together but are beginning to collapse. The whole body is co-ordinated to absorb the impact shock.*



refocusing attention upon this very undesirable feature.

There is nothing like personal experience of an unpleasant incident to stimulate a desire to get things put right. Just as my broken leg gave me a virulent dislike of twisted rigging lines so did Germaine's ignominous and painful landing on his posterior arouse his worst passions against unstable parachutes. In next to no time he produced a statistical paper which showed that the personnel of a Parachute Brigade would become a minus quantity in about eighteen months and that fifty per cent of the wastage would be directly due to oscillation. A stable parachute, he claimed, was the nation's most urgent need.

I don't know whether Lieut. Colonel T. A. Germaine became associated with airborne forces by accident or design. All I can remember is that he appeared at Ringway one day as a staff officer for the Airborne Forces Experimental Establishment and that we got to know him quite well. He was a thoughtful and conscientious sort of chap and, as his duties were closely concerned with development work on parachutes, he went through a course and jumped regularly so that he should know what he was talking about when dealing with parachuting matters. After the A.F.E.E. was divorced from the P.T.S., and moved away to Sherburn-in-Elmet, we were no longer officially permitted to associate with each other or exchange ideas. His unit came under the Ministry of Aircraft Production and ours under the Air Ministry and the circumforaneous system by which communications had to be transmitted rendered intelligent intercourse quite impossible.

D.O. Correspondence

However, on this particular occasion, Germaine was fired with the righteousness of a martyr's grievance, and felt much more strongly about the subject of parachute oscillation than he did about rules of procedure. He therefore resorted to that quaint method of letter-writing peculiar to the Services which is known as D.O. (demi-official) correspondence. Just as a merchant uses the mystic letters E. and O.E. to protect himself against possible errors in his invoices so, in the Services, if an officer wishes to write something which he knows he shouldn't, to a person with whom he's not supposed to communicate, he merely writes D.O. at the head of his letter. Having observed this simple precaution he is more or less entitled to regard himself as immunized from any unpleasant repercussions. Junior commanders were firmly of the opinion that practically all "high-level" business was transacted by this means.

Germaine sent me a copy of his memorandum and hinted that if the matter were dealt with by the normal routine procedure the war would probably have been won, or lost, before any effective action was taken. With sublime ingenuousness, or consummate discretion, he concluded his covering letter with the words: "Should you wish to add.or detract in any way from the views expressed in the memorandum you will no doubt take suitable action through the usual channels."

It so happened that Germaine's supplication reached me at a time when I was already in the process of analysing the nature, extent and causes of parachuting injuries as they had been revealed to me during my visit to India and the Middle East. There was a tendency to regard parachuting results by local standards instead of by the

EARLY DAYS. *The Whitley as a paratroop aircraft was difficult of ingress and exit and as uncomfortable as it appears.*

wider appreciation of universal application. Although men would be trained under varying conditions and circumstances it was necessary for them to be fit for employment in any part of the world, and a standardized parachuting technique must take such considerations into account. Except by certain elements in the R.A.F., who were obsessed with the importance of their own particular rôle, military parachuting was no longer regarded as a sort of circus act, but was rapidly becoming recognized by the Army as a vital factor in future operations. As the airborne battalions grew into brigades and the brigades into divisions it became increasingly evident that sound training was the key to success.

It was clear enough from all the records that the uncontrolled landing was the most serious technical problem in military parachuting, whether this was carried out in England or Timbuctu. The inherent instability of the parachute, which permitted the slightest air current or gust of wind to set up that pendulum swing which so often landed a man slap on his back, was unquestionably a matter of the highest importance. Almost equally dangerous was the menace of twisted rigging lines which practically nullified any attempt to control the parachute and caused a man to strike the ground while he was rotating like a slowly spinning top.

Injuries

The nature of the injuries derived from these causes was most worrying. Whereas a straightforward broken leg or arm could normally be mended without much ultimate damage, the shock to the nervous system caused by a bad concussion or spinal injury was likely to affect a man's faculties for the rest of his life. The remote control statisticians, who occupied the seats of higher authority, were content to think that everything was fine so long as men didn't get killed during training, but we were closer to our pupils than that and we didn't like them to get hurt if we could prevent it.

Apart from the fact that it was the responsibility of the Royal Air Force to give the soldiers the best possible training, everyone on the P.T.S. staff was personally anxious to contribute what he, or she, could to lighten the anxieties and hazards to which the pupils were subjected during the time they were at the School.

It was true that the injury rate had been very greatly reduced from what it had been in the early days, but we were a long way from being satisfied. We knew, too, that the injury rate rose sharply after our men had joined their units and took part in exercises where they lacked the comforting presence of the "nursemaids in blue," as Eric Down ironically but nevertheless affectionately, referred to the R.A.F. instructors.

And so it was that during the glorious July days, while General Crawford was discussing airborne operations in Sicily, and Kilkenny was studying American methods at Fort Benning, I spent my time at Tatton Park with a pair of binoculars watching parachute landings from early morning until late evening. I had no confidence that a stable parachute would be produced within a reasonable time, and felt that an improvement in flight and landing technique offered the best means of reducing uncontrolled landings and the injuries which resulted.

The more I watched the more impressed I became with certain similarities between flying a parachute in the air and sailing a small boat on the sea. I reflected that air and water were both unstable elements which were fundamentally uncontrollable. Both were subject to atmospheric forces which caused currents, waves, eddies and varying degrees of buoyancy. A sailing boat could not of itself resist the movements of the waves, and a parachute was similarly at the mercy of wind and air currents. Both could, however, be controlled to some extent by human agency. A skilled sailor would ensure that his craft was correctly trimmed, and a trained parachutist should be able to poise his body in the best position for landing. Had we sufficiently explored the possibilties of improving upon the existing methods of parachuting? I thought not.

The technique which we taught had been strongly influenced by the insistence of the pre-war professionals that landings must be made with the parachutist facing in the same direction as that in which he was drifting. That method may have been all right for an expert descending from several thousand feet on a fine day, with plenty of time at his disposal, and nothing else to think about. For a soldier dropping from a few hundred feet, possibly at night, and certainly laden with equipment, the method just wasn't practicable. I decided to re-examine the whole problem in the light of the experience gained during the past two years and see if a simpler, and more satisfactory, technique for controlling the parachute could be devised.

Dick Richards was deputizing for Kilkenny during his absence, so I explained my ideas to him and the senior instructors. I impressed upon them that parachuting had become a really important factor in planning future military operations, not only in Europe but in distant parts of the world. General Gale had been appointed to raise and train the 6th Airborne Division in readiness for the opening of the "Second Front" in Europe when the appropriate time arrived. Increasing numbers of men would require to be taught parachuting, and it was the responsibility of the P.T.S. to ensure that the methods were the best

The author with Major-Gen. Crawford who was the first officer of General's rank to take a course of parachute training. His first drop was made into a lake.

Prelude to Glory . . . . .

that could possibly be evolved in the circumstances. At present there were far too many injuries being caused through uncontrolled backward landings. It was quite obvious that the soldier couldn't be expected to do any fancy manipulations with the parachute, so that the essence of the technique must be simplicity. I told them to make as many jumps as they could during the next few days and experiment with any methods of control that occurred to them. The objectives to be borne in mind were the elimination of oscillation and the need for turning into the line of drift. Any method must be easy for the average soldier to understand and use.

'Gebolys, the Polish instructor, who was probably one of the best parachutists in the world, produced the first really promising ideas. He found that by pulling down both of the front, or back, lift-webs, and holding them in that position the distortion caused to the shape of the canopy effectively damped oscillation. Quite a considerable physical effort was required, and there was no doubt about the result. The efforts were not wholly desirable, but this simple discovery was of immense value because it provided a sound base upon which further experiments could be developed. All the instructors were told to give the new ideas a thorough trial and then to express their opinions regarding its effectiveness.

It was soon found that besides damping oscillation the distortion of the canopy affected the flight of the parachute in other ways. If a parachutist was facing in the direction in which he was drifting and pulled down the front lift-webs his rate of drift increased. If, in the same circumstances, he pulled down the back lift-webs his rate of drift decreased. Similarly, if he was drifting backwards his speed was reduced by pulling down the front lift-webs and increased by pulling down the back ones. Another very important and advantageous feature was that the method of holding the lift-webs facilitated the correct positioning of the body for landing. Hundreds of descents by the instructors were carefully studied until there remained no doubt at all that the new method of control was a great improvement on the method which was being taught.

The new ideas were completely revolutionary to established practice, and the most surprising fact which emerged from these trials was that the correct employment of the new technique rendered backward landings safer than those made in a forward direction. I was completely satisfied, from the reports of the instructors and my own observations, that Gebolys had made a discovery of great importance to military parachuting. Further experiments were made and the new methods were finally reduced to a simple form which would be easily taught. These improvements were not achieved without cost to the instructional staff, Sergeant Howard Burt sustaining concussion and, more serious in this case, Sergeant John Sharp smashed his ankle severely, and there were several minor casualties.

The next problem was to design suitable training apparatus that would simulate the required actions and enable them to be practised on the ground until they became as instinctive to a soldier as his more orthodox drills. We were making definite progress and parachute landings had come within the range of prediction and control, providing that sufficient time was allowed for pupils to master the instructions thoroughly, and for them to be kept in practice after they had left the School.

Before a fundamental change in training methods could be officially introduced, Air Ministry approval had to be obtained. This necessitated a recommendation from the School, which had to be supported by Group and Command Headquarters. As I was well aware of the censorious habits of some of the officers who found their way into staff appointments I decided to introduce the improved technique and apply for official permission later. In this way positive statistics, covering many thousands of jumps by both the old and the new methods, could be provided in support of the recommendation. The results were highly satisfactory and a comparison of twenty-five thousand descents by each method showed an overall reduction in the injury rate of thirty-eight per cent. Even more important was the alteration in the site of the injuries. Concussions were reduced by seventy-eight per cent; spinal injuries by fifty per cent; and, deeply significant, leg injuries now constituted approximately sixty-four per cent of all parachuting injuries sustained during the training at Ringway. Germaine's discomfiture had set in train a sequence of events of first-rate importance.

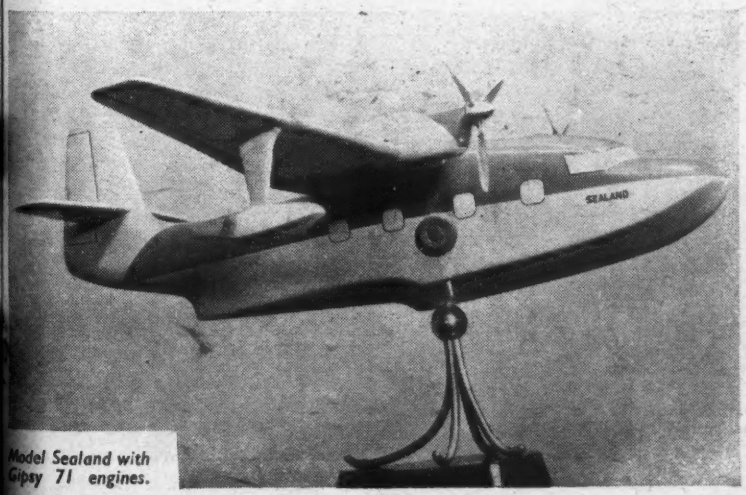
Two further chapters of G/C. Newnham's book are being published in serial form by "Flight." The second instalment will deal with the comparison between American methods of teaching parachuting and those practised at the Parachute School at Ringway, near Manchester.

SHORT SEALAND AMPHIBIAN

THE prototype of Short's small twin-engined amphibian the Sealand, is now nearing completion at Belfast, and news of its first flight may be expected in a few weeks' time. This first machine is powered with two D.H. Gipsy 71 engines which together give a maximum of 660 h.p. With this power and an all-up weight of 8,500 lb, five passengers can be carried, with luggage, for a range of 540 nautical miles. The possibility of producing an Alvis Leonides-engined version of the Sealand has also been studied, and with two 515 h.p. units the performance on one and two engines would naturally be greatly improved. This might be of particular importance to buyers wishing to operate this amphibian from mountainous countries and high-altitude lakes.

The Sealand is a particularly promising aircraft and should be a very valuable addition to our export range.

Dimensions are: span 59 ft; gross area 354 sq ft; length 42 ft; beam 5 ft 3 in.



Model Sealand with Gipsy 71 engines.

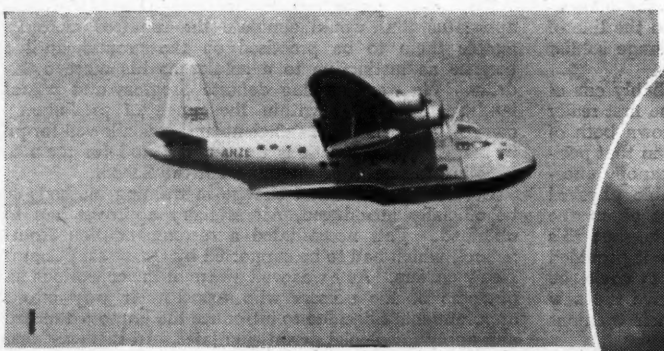
PROCTOR ON FLOATS

FOLLOWING some enquiries from overseas, in particular from Canada, Percival Aircraft, Ltd., recently fitted a Proctor with floats. The co-operation of Short Bros. was then sought and some successful flight trials have now been made from the Medway at Rochester. First tests were made by S/L. John Booth, Short's test pilot, and Mr. Carruthers, Percival's chief test pilot, then took over. It is understood that although the present pair of floats are on the heavy side for the Proctor she nevertheless handled very well on take-off and landing and performed satisfactorily in the air.

ELSTREE DISPLAY and RALLY

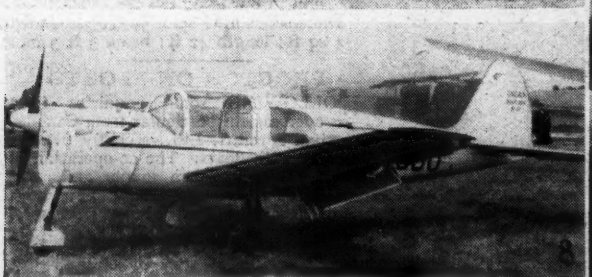
Aircraft—Large and Small, Old and New—Demonstrated at U.S.F.C. Airfield

Illustrated by "Flight" Photographs

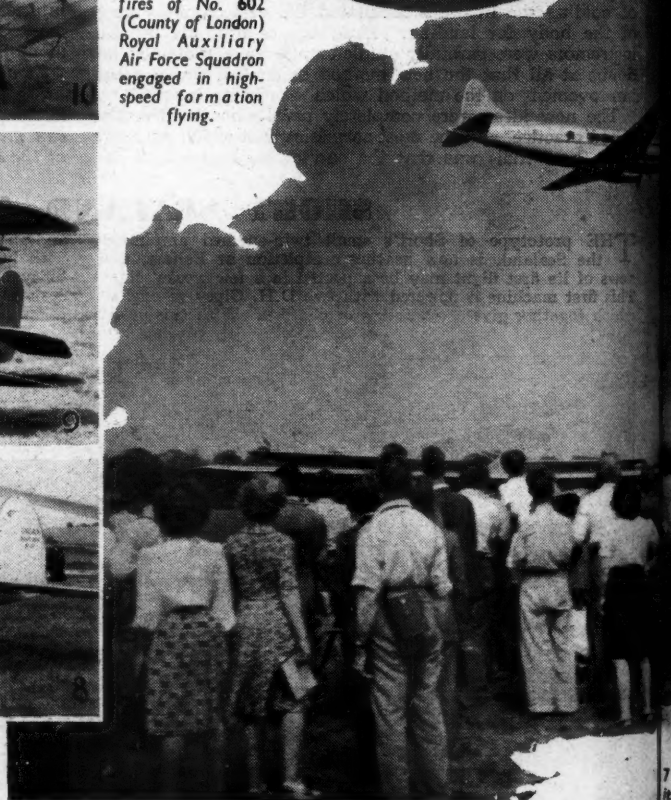


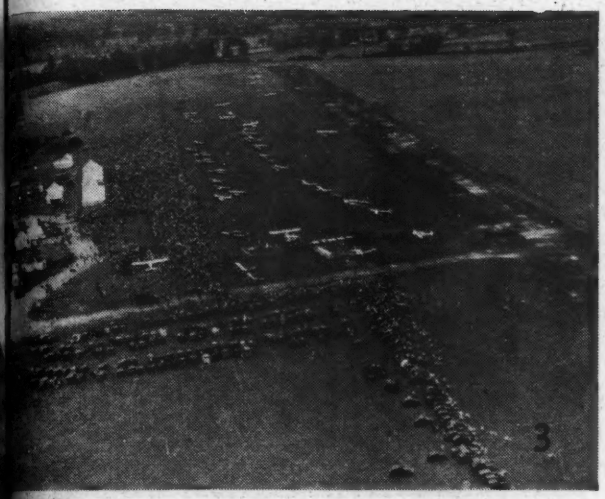
1: The B.O.A.C. Plymouth-class flying boat "Portsea" during its impressive slow fly-past at Elstree. Plymouth-class flying boats are now supplementing Hythe-class on B.O.A.C.'s weekly service to Hong Kong.

2: Six Spitfires of No. 602 (County of London) Royal Auxiliary Air Force Squadron engaged in high-speed formation flying.

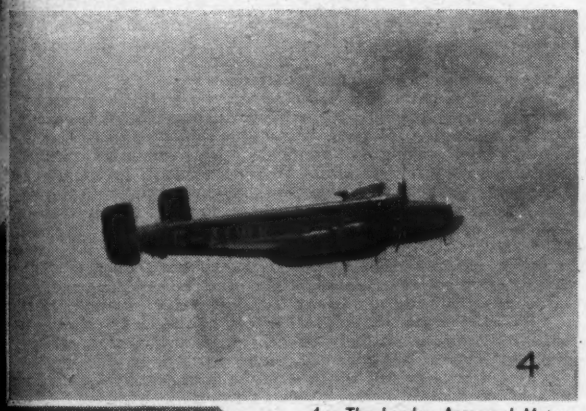


Three of the interesting aircraft on show at Elstree were (8) the French sports three-seater Nórecrin, (9) the Miles Martlet, and (10) a "Shuttleworth" Sopwith Pup.





3: *An aerial view of the Pageant showing a section of the crowd which was estimated to number 12,000. The aircraft parked amongst the spectators is the Fairchild Argus belonging to the W.J.A.C.*



4: *The London Aero and Motor Services' Halifax "Port of Sydney," during its demonstration fly-past.*

ALTHOUGH public utility communications with the airfield leave something to be desired, this did not appear to be very much of a preventive to the crowd of about 12,000 who turned up for the Air Display and International Rally held, as recorded in our last week's issue, on July 27th by the United Services Flying Club at their home airfield at Elstree.

The day opened with a breakfast patrol, only three attacking aircraft succeeding in penetrating the U.S.F.C. defence screen; however, we understand 70 servings of egg and bacon were provided, so a good time was evidently had by all who turned out so early. At 11 o'clock Austers of the U.S.F.C. opened the sequence of the morning events with a spot of formation flying, which was followed by some extremely good "ham" flying by Mr. Wade in a Tiger Moth.

The rest of the morning until lunchtime was taken up by various participants arriving, together with some practice for the afternoon events. Of these Harald Penrose celebrated his arrival from Yeovil in the 20-year-old Widgeon by the employment of an ancient—yet seemingly powerful—bulb horn, wherewith the Widgeon lolloped across the airfield honking like a distraught goose.

Councillor R. W. North, the Mayor of Watford, officially opened the pageant at 2 o'clock and informed the steadily increasing crowd that it was intended that the annual Elstree Rally should give Londoners a view of aviation's latest developments in the absence of the renowned Hendon displays of pre-war glory.

The first "official" event to titillate spectator interest was a fly-past of the London Aero and Motor Services' Halifax, *Port of Sydney*. This aircraft will be remembered as being the first aerial tramp. On this occasion the machine was off to Milan with a load of freight, and having taken off from Stanstead, the L.A.M.S. base, gave the spectators at Elstree an idea of its size and speed. When the Halifax had continued on its way, its place was taken by the B.O.A.C. Plymouth-class boat *Portsea*, which put up the usual immaculate display of slow-speed control and quiet effortlessness that we who attend most air displays have grown to expect.

Following the departure of the flying boat, the spectators were treated to a demonstration of the Dove's quiet speed and obvious tractability, a feature of this turn being fly-pasts with the starboard airscrew feathered; and a demonstration of the use of braking airscrews to make a very short landing-run, finished off by backing the aircraft up to its parking position. As this was being done, various light aircraft got into the sky and did their pieces, outstanding among these being the Danish KZ-III Lark, which was particularly im-

(*Continued at foot of next page.*)

6: *Miss June Hamphries (centre), winner of the Southern area A Licence flying scholarship, poses with four members of the W.J.A.C. beside the Corps' Fairchild Argus.*

5: *Mme Bellu, helped by her husband, adjusts her parachute prior to making her 108th parachute descent.*

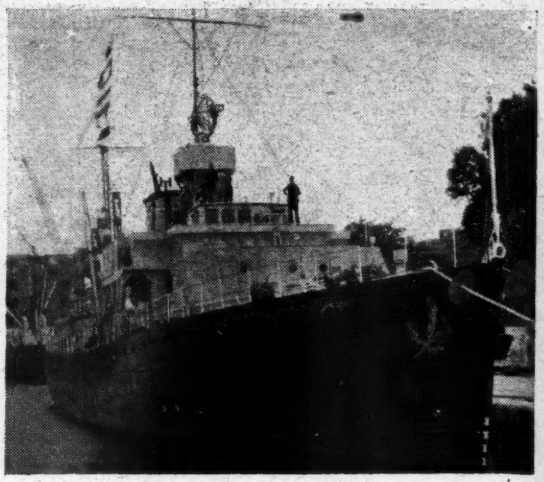
7: *The D.H. Dove. It later demonstrated its reversible-pitch airscrews by backing into its parking place.*

Weather Observer

First British "Met." Ship

THIRTEEN weather observation ships are to be situated in the N. Atlantic and the first British converted corvette is about to take up station. A brief reference to the organization is made on page 145 of this issue.

When at sea, surface observations will be made by the meteorological staff every three hours, but every six hours a balloon will be released carrying a radio sonde and a radar reflector for observations of the upper atmosphere. For inflating the balloons, which measure 6ft in diameter and which, incidentally, expand to about 16ft before bursting at their ceiling of 55,000ft, a special hut has been constructed at the aft end of the ship. Change in temperature, humidity and pressure is automatically transmitted from the radio sonde and will be plotted by the weather ship observer, and the wind direction and speed will be measured by tracing the path of the balloon and reflector on the ship's radar. The balloon ascends at the rate of 1,200ft/min. Radio sonde costs about £6, the balloon 15s, the battery 10s, and the radar reflector 25s. Each ascent, therefore, with hydrogen and incidental apparatus costs approximately £10. There was some difficulty in arranging storage for the cylinders of hydrogen owing to their excessive weight, but a system has now been developed for producing hydrogen from magnesium iron pellets and the number of cylinders carried has been consequently reduced. The method for finding the height of cloud when at sea presented a problem owing to the constant movement of the base, but a new method is being developed with a searchlight on a pulse measuring system, which is also equally efficient in day-time. Similarly, there was some difficulty devising a system for measuring visibility owing to the absence of visible objects. The weather ships, however, are being equipped with a loofah-type visibility meter which measures scatter coefficient, that is, the extent to which a beam of light is scattered by water droplets and other impurities in the air. The outside air passes through a box-like instrument and across a beam of light which can be seen through an observation hole. When the light is switched on the field of view in the eyepiece consists of two parts, the one illuminated by light scattered by the air inside the instrument, and the other illuminated by the same lamp but through a variable filter of known capacity. The filter may be adjusted by a control knob until both parts of the field have equal illumination. The scale reading gives the scattering coefficient and from that the visibility may be calculated, assuming, of course, that the air inside the instrument is a true example of the air outside.



O.W.S. Weather Observer in Shadwell Basin, London Docks. The P.P.I. scanner can be seen above the platform on the foremast.

Rain gauges are on gimbals, and others have been suspended from different parts of the ship's structure since the presence of spray would give false rainfall measurements. It will normally be necessary to measure the salt water content before determining the amount of rainfall. In order to make accurate forecasts of fog formation and in some areas of sea freezing, the surface temperature of the sea must be accurately measured to within .1 deg C. Since salt is apt to form on the wet bulbs and give an erroneous value of humidity, special instruments have been made.

An interesting instrument also is the hand anemometer, which works on the magnetic drag principle. Its value lies, of course, in its use for determining differences in wind speed at different parts of the ship. There is, of course, the permanent fitting of the normal cup generator anemometer, which gives readings of instantaneous wind speed.

All observations will be transmitted immediately by radio to the Central Forecasting Office at Dunstable.

Elstree Display and Rally—*Contd.*

pressive in its very slow fly-past, hanging on airscrews and flaps at very little above its stall.

Individual aerobatics by S/L. G. B. S. Coleman in a Tiger Moth and by Mr. D. E. Millar in a beautifully kept Miles Martlet were judged by six non-flying spectators picked at random from the public. Unfortunately, Mr. Millar tipped the Martlet on to its nose when putting the little aircraft into its parking space—curiously, the airscrew suffered no damage—and this perhaps influenced the panel of judges in awarding the contest against him. This was a fine example of democracy, for among those capable of appreciating the niceties of aerobatics there was unanimous agreement that the Martlet was handled far more neatly than was the Tiger Moth.

Mme. Bellu, the bespectacled, petite French parachutiste (whose equipment is looked after by her husband, a retired French boxer) next ascended in a Tiger to a programme height of 2,000ft, which to us looked certainly no more than 1,400ft. The lady stepped neatly over the side and made the 108th descent of her career in fine style.

A flight of Spitfires of 601 Squadron flew over from Hendon and showed the crowd general formation manœuvres, then gave a really low full-throttle beat-up before wedging themselves into the conventional vic and returning to their base.

Foreign light aircraft—the Norecrin, the Piper Supercruiser and the Ercoupe—showed themselves and then Mr. Dudley Hiscox, in the Elliot Olympia sailplane, was successfully towed into the air by an Auster after an initial abortive attempt when the "string" broke. However, Mr. Hiscox made a quite usefully protracted flight and brought his sailplane in for a perfect landing (using spoilers for the last few yards), the silence and grace of his performance earning him a well-deserved burst of applause.

An Aerovan arrived and did a very slow fly-past, whilst Mr. B. H. Arkell took the Cierva Autogiro off and flew about over the spectators' heads so slowly as nearly to be hovering.

Harald Penrose then treated the assembly to a display of crazy-flying on the Widgeon such as only he can do. For most of the time the Widgeon was flying sideways and this, in turn with what we can only refer to as side-climbs, as distinct from side-slips and "pupils'" turns, brought the crowd to vociferous acclamation for the performance.

Two flights of Spitfires from 601 and 602 squadrons again came over from Hendon, this time doing little more than formation-keeping in various orders.

In tremendous contrast to this last event, a Sopwith Pup managed to get off the ground at its second try, its 80 h.p. le Rhône engine having nearly cut on the initial attempt at take-off. This 1916 single-seater fighter was in truly immaculate condition and appeared by courtesy of the Warden Aviation and Engineering Co. in association with the Shuttleworth Memorial Trust.

The thousands of people who witnessed the programme seemed thoroughly to enjoy themselves and it was an event which deserves the organizers' intention of making it into an annual feature.

CIVIL AVIATION NEWS

First Weather Ship Completed: Pilots Licence Changes : Swedish Policy for Airlines

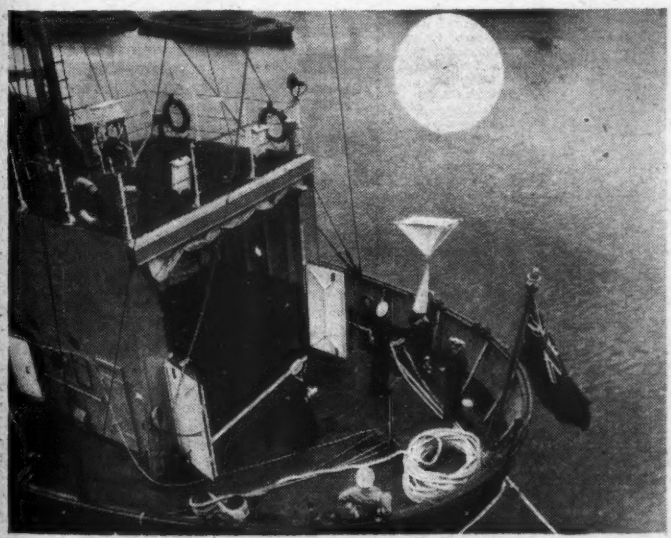
SABENA SIDELINE : At the Brusse's show last month Sabena made some very effective formation flights with Skymasters and Dakotas.

FIRST WEATHER SHIP

BY the I.C.A.O. agreement signed in London last October Great Britain is to be responsible for maintaining two weather observation ships in the Atlantic in positions 60°00'N 20°00'W, and 53°50'N 18°40'W, and to assist Norway and Sweden in maintaining another in position 66°00'N and 12°00'E. The agreement provided for the scheme to be in full operation by July 1st this year, but preliminary arrangements and the conversion of the ships has taken longer than was expected.

As announced previously in *Flight*, the U.K. have chosen Flower Class corvettes on account of their seaworthiness and relative economy of operation, and also the availability of several of the type in good structural condition at relatively low cost. Conversion has been completed on the first ship, H.M.S. *Marguerite*, christened Ocean Weather Ship *Weather Observer* on July 31st by Mr. Noel Baker, and which left the London Docks the following day to be at the southern British station after seven days' sailing. The ships, when in position, will provide stations for making meteorological observations of surface and upper air conditions and supplement the surface observations provided by merchant ships on the normal trade routes. Incidentally, as an indication of the service provided by the selected British ships, there were 2,552 reports made in the eastern part of the North Atlantic by them during last May. Navigational aid will also be provided to aircraft and ships by W/T. and by bearings from a Eureka beacon.

The ships are equipped to provide an air/sea rescue service.



GOING UP : Launching a met. balloon from the weather ship after inflation in the special construction.

TUDOR IV TRIALS

THE first Tudor IV delivered to B.S.A.A. and which left London on July 23rd for trials in the West Indies returned on the 29th. 11,714 miles were covered in 37¼ hours. The aircraft was flown at 20,000ft for several hours and pressurization worked efficiently. The engines worked perfectly throughout, and we understand that the crew were satisfied that no modifications will be necessary to the airframe. It was unfortunate that insufficient petrol prevented the flight home from Bermuda being made in one hop, and a refuelling call was necessary at the Azores. The Tudor behaved well under all the climatic conditions experienced during the trials, and the Corporation intend to adopt it and hope to start operations with three of the type in September.

NEW AIRWAYS CENTRE

BRITISH EUROPEAN AIRWAYS have acquired, under a 28-year lease, the ground floor and basement of Stafford Court, a block of shops and flats in High Street, Kensington. The Corporation will use the premises as the arrival and departure point in London for all B.E.A. passengers and freight, and for the companies for which the Corporation acts as an agent. The premises will, therefore, replace Airways Terminal for all B.E.A. passenger handling in London. Considerable modification will be necessary to the building, which already consists of two separate units. The larger unit will act as a departure point and will be divided into ten bays capable of handling about 40 or 50 aircraft departures each hour. There will also be waiting halls and a buffet in the basement. The smaller unit will deal with arrivals only.

Stafford Court may be reached easily by bus and underground, but the service from London to Northolt by special coach will be continued as at present under the administration of the L.P.T.B. It has been obvious for some time that Airways Terminal, Buckingham Palace Road, was inadequate for the amount of traffic, and it is hoped the move to Stafford Court will take place early in 1948. The B.E.A. booking centre will eventually be transferred to Dorland Hall, in Lower Regent Street.

PILOT LICENCE EXAMINATIONS

ON August 26th the system for examining applicants for pilots "B" licences will be slightly amended. There are to be some concessions which, although not of a drastic nature, are important and show a realization of the practical needs in commercial flying. The present examination requires all applicants to commit to memory rules and regulations which are seldom needed. Much of the legislation is required only for commercial purposes and there is no necessity for every captain to memorize details, and a knowledge of where the regulations may be found is all that is necessary.

The new scheme will require in the technical examination on Aviation Law (Specific Subjects) a brief supplementary oral test to be taken on the rules of the air, and a detailed

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knowledge of those *Notices to Airmen* which refer to flying safety, communications in the air, and air traffic procedures. Documents will not be allowed in the examination room, and the examination will be concerned only with those Regulations and *Notices* in force fourteen days before the date of the examination.

The examination in Aviation Law (General) is to be in the form of a written test on the general knowledge of the arrangement and contents of the various Regulations and Acts published by the Ministry. The object of the section is to assess a candidate's ability to extract information readily from the relevant documents, and candidates will be permitted to refer to their own documents during the examination.

The Ministry of Civil Aviation have published a booklet entitled *Civil Pilot's Licence Class "B" Technical Examination*, dated April, 1947, and with the Stationery Office No. M.C.A.P 18. This booklet explains the requirements of the new examinations, gives an outline of the syllabus, and a section is devoted to typical questions in the various subjects on which pilots are to be examined.

HELICOPTER LICENCE

LAST month the C.A.B. issued the first certificate authorizing air transport of property and mail by helicopter. Los Angeles Airways have been granted permission to operate for a period of three years with helicopters over three circular routes totalling approximately 200 miles and radiating out of Los Angeles to thirty post offices in the area. The time limit has been set in view of the unknown potentiality of the helicopter, and the Board wishes to see whether the proposed service can be maintained on an economically sound basis with substantial public benefit, something which can be established only by experience.

Since the middle of April the American operator, Skyway Corporation, has been flying a helicopter service from Logan Airport to the roof of an eight-storey garage in Boston. During the first ten weeks one helicopter flew between the airport and the city once every fifteen minutes, from 9 a.m. to 7 p.m. daily. A total of three helicopters have now been acquired and the company plan to run 120 schedules a day and abolish reservations. The majority of passengers are from the aircraft landing and taking off from Logan Airport, but about 20 per cent are sightseers. The fare is about 17s 6d. A C.A.B. licence is not required for operations of this kind, where no flight is made from one state into or across another.

M.C.A. ADVISERS

THE Minister of Civil Aviation has made three appointments for the purpose of advising him on three important aspects of civil aviation. Professor George Temple, who is to be the Chief Scientific Adviser, is Professor of Mathematics at King's College, London, a member of the Aeronautical Research Council and a fellow of the Royal Aeronautical Society. Throughout the war he was engaged on specialist duties at the R.A.E., Farnborough. Professor Temple will receive an annual honorarium of £500, the others will be unpaid.

Chief Business Adviser to the Ministry is to be Mr. Leslie Gamage, vice-chairman and joint managing director of G.E.C. For the past four years he has been president of the Institute of Transport and was president of the Chartered Institute of Secretaries in its jubilee year. Mr. Gamage represents the Joint Air Transport Committee of the Association of British Chambers of Commerce, the Federation of British Industries, and the London Chamber of Commerce, on the National Civil Aviation Consultative Council.

The Chief Adviser on Industrial Relations will be Lord Dukeston, who was general secretary of the National Union of General and Municipal Workers, and was president of this year's Trade Union Congress. He also represents the T.U.C. on the National Civil Aviation Consultative Council.

AIRCRAFT REFUELLING

BELOW is an alphabetical list, complete to July 21st, of airports at which aviation spirit is available for re-sale.

Airfield	Octane No.			Retailer
Aberdeen	100	87	73	Petroleum Board
Aldermaston	100	—	—	Petroleum Board
Balada	—	87	73	McDonald Aircraft
Barton	—	87	73	Manchester Corporation
Belfast (N.C.)	100	87	73	Petroleum Board
Belfast (Syd.)	—	87	73	Short & Harland
Benbecula	—	87	73	Ministry of Civil Aviation
Blackbushe	100	87	—	Petroleum Board
Blackpool	100	87	73	Petroleum Board
Bovingdon	100	87	—	Petroleum Board
Brough	—	—	73	Blackburn Aircraft
Broxbourne	—	87	73	Herts & Essex Aviation
Cambridge	—	87	73	Marshall's Flying School
Cardiff (P.M.)	—	87	73	Petroleum Board
Carlisle	—	87	73	British Air Transport
Christchurch	—	—	73	Bournemouth Airport
Cowes	—	87	73	Cowes Airport
Cranfield	100	87	73	College of Aeronautics
Croft	—	—	73	John Needham, Croft Airport
Croydon	100	87	73	Petroleum Board
Denham	—	—	73	Bickerton's Aerodromes
Derby	—	87	73	Air Schools
Desford	—	87	73	Reid & Sigrist
Edinburgh	100	87	73	Petroleum Board
Elmdon	—	87	73	Midland Aero Club
Elstree	—	87	73	London Aero and Motor Services
Exeter	—	87	73	Petroleum Board
Fair Oaks	—	—	73	Universal Flying Services
Gatwick	100	87	73	Airwork General Trading Co.
Gravesend	—	87	—	Essex Aero
Guernsey	100	87	73	States of Guernsey
Hanworth	—	87	73	London Air Syndicate
Hatston	—	87	73	Petroleum Board
Hurn	100	87	73	Petroleum Board
Inverness	—	87	73	Petroleum Board
Jersey	100	87	73	States of Jersey
London Airport	100	—	—	Petroleum Board
Luton	100	87	73	Luton Corporation
Lympne	—	87	73	Field Aircraft Services
Macmerry	—	—	73	Edinburgh Flying Club
Newtownards	—	87	73	Ulster Aviation
Northolt	100	87	73	Petroleum Board
Old Warden	—	—	73	Warden Aviation Co.
Oxford	—	87	73	Goodhew Aviation Co.
Perth	—	87	73	Airwork
Peterborough	—	—	73	Morrison's Aircraft Services
Plymouth	—	—	73	Plymouth Airport
Poole Flying Boat Station only	100	—	—	Petroleum Board
Portsmouth	—	87	73	Portsmouth Aviation
Prestwick	100	87	73	Petroleum Board
Pwllheli	—	87	73	Butlins
Rearsby	—	—	73	Auster Aircraft
Renfrew	100	87	73	Petroleum Board
Ringway	100	87	73	Petroleum Board
Rochester	—	87	73	Rochester Flying Club
Ronaldsway	100	87	73	Petroleum Board
Sherburn	—	87	73	A. G. Wilson
Shoreham	—	—	73	Brooklands Aviation
Southampton	100	87	73	Southampton Corporation
Southend	—	87	73	Southend Corporation
Speke	100	87	73	Petroleum Board
Stanstead	100	—	—	London Aero and Motor Services
Staverton	—	—	73	Gloucester Flying Club
Stornoway	—	—	73	Petroleum Board
Sywell	—	—	73	Brooklands Aviation
Tollerton	—	87	73	Tollerton Aircraft Services
Tollerton	—	87	73	Nottingham Airport
Walsall	—	87	73	Helliwell's
West Hartlepool	—	87	—	Northern Air Charter
Weston-super-Mare	—	87	73	Western Airways
Whitchurch	100	87	73	Petroleum Board
White Waltham	—	87	73	West London Aero Club
Wolverhampton	—	87	73	Air Schools
Woodley	—	87	73	Miles Aircraft
Woolsington	100	87	73	Newcastle Corporation
Yeadon	—	87	73	Lancashire Aircraft Corp.
Yeovil	—	—	73	Westland Aircraft

SERVICES IN NEW ZEALAND

NEW ZEALAND airlines carried more than 110,000 passengers on internal services during the last financial year. There were only ten aircraft operating in the first quarter, but the number had increased to twenty by the end of the year. By the end of 1947, thirty-six aircraft are expected to be operating on the Corporation's system and they will include ten Dakotas, ten Lodestars, five Electras, six Dominies, three Fox Moths and two Sunderlands.

The aim of the National Airways Corporation is to create a network of air services so that any point in New Zealand is within twelve hours of any other. The Corporation has now taken over the majority of New Zealand's privately owned internal airlines, and the first task will be to strengthen the services on the north-south routes connecting the four main cities. Developments include an increased frequency of Lodestars on the main trunk line between Auckland, Wellington and Christchurch, and the introduction of Dakotas on that route. The present services maintained by the R.N.Z.A.F. between Auckland and Fiji with Sunderlands will be taken over with effect from October 1st, and extensions will be attempted from Suva to Lambassa according to traffic requirements. The average load on the main routes is at present about 95 per cent, and sometimes 99 per cent, of capacity. The objective, however, is to operate at 70 per cent of capacity, to avoid unnecessary advanced booking.

I.C.A.O. DIARY

FORTHCOMING Divisional meetings of the International Civil Aviation Organization:—

Special Caribbean COM Meeting.	Mexico City ..	August 18th, 1947.
Special Meeting MET Division.	Montreal ..	September 17th, 1947.
Joint AIR/OPS Committee Meeting.	Paris	September 23rd, 1947.
Aerodromes, Air Routes & Ground Aids Division (AGA).	Montreal ..	September 23rd, 1947.
Meeting on Multilateral Agreement.	Rio de Janeiro, Brazil.	October 20th, 1947.
Search and Rescue Division.	Montreal ..	November 18th, 1947.
Personnel Licensing Division (PEL).	Montreal ..	January 13th, 1948 (tentative).
Statistics Division ..	Montreal ..	January 13th, 1948.
Maps & Charts Division (MAPS).	Brussels ..	March 22nd, 1948 (tentative).
Rules of the Air & Air Traffic Control Division (RAC).	Montreal ..	April 20th, 1948.
Facilitation Division (FAL).	Europe ..	April 27th, 1948.
Airline Operating Practices Division (OPS).	Montreal ..	March or September, 1948 (tentative).
Airworthiness Division (AIR).	Montreal ..	March or September, 1948 (tentative).

AIRLINE SUBSIDIES

IN the opinion of the New York banking world, subsidies from the government for American airline companies will only serve to perpetuate the faults that have so far prevented them from finding additional capital elsewhere. The reason given by private financiers when refusing to advance further capital to the airlines has been that of bad management, and it is considered that if capital is obtained from the government the management will continue as it is now. If, however, capital is eventually obtained from private sources an improvement in efficiency will be necessary to assure continued backing. As the view of many is that American airlines are run on an uneconomic system due to overlapping in the coverage of many routes and poor public support on others, a number of amalgamations would be desirable, and the bankers believe that if a programme was carried out intelligently the C.A.B. would give its approval to a number of combines. It is thought doubtful whether the airlines really know how costs are affected by expansion in their fleets.

SWEDISH AIRLINE POLICY

A.B. AEROTRANSPORT is owned by the Swedish Government, and Svensk Interkontinental Luft Trafik A.B., better known as S.I.L A , is a privately owned Swedish airline company. Although A.B.A. was formed as a private company it was practically state-owned by 1935, and, with a government appointed chairman, adopted a policy which was not agreeable to an expansion of services over inter-Continental routes. In consequence S.I.L.A. was founded in 1943 as a private company to concentrate on flying scheduled services between Sweden and North and South America. It was agreed that A.B.A. should place certain personnel and part of its technical organization at the disposal of S.I.L.A., in return for commission on the income from the private company. The result is that S.I.L.A. receives no economic support from the government but instead is a source of income for the government, through A.B.A., regardless of whether or not profits have been made.

In the autumn of 1945 the Swedish Board of Civil Aviation proposed the amalgamation of the two companies. At that time S.I.L.A. favoured the proposal, on condition that such a combination should be either wholly or partly financed by private capital, but if that was not possible S.I.L.A. wished to continue its activities as an independent company. Since 1945 air traffic has increased, and it is considered that the difference in techniques between operations on European and inter-Continental routes has become even more marked and any advantages which might have resulted from an amalgamation have now disappeared. The increase in inter-Continental traffic has prompted S.I.L.A. to take a firm stand in recent discussions with the Swedish Minister of Communications, and has requested that the company might be allowed to continue with that air traffic which is within the framework of the combined Scandinavian organization, the Scandinavian Airlines System. S.I.L.A. is prepared, however, to continue co-operation to an extent which would be profitable to both parties. The rapid development of A.B.A. has caused internal problems and the company cannot now fulfil its part of the bargain with S.I.L.A. and cannot increase the technical service which it now supplies to S.I.L.A. and S.A.S. Consequently S.A.S. have been forced to make arrangements with an American firm for Stratocruiser servicing to be done in New York. It is quite apparent that such a situation would not be improved by an amalgamation of the two companies. If, however, the Swedish government insist upon an amalgamation as an urgent measure, the private company will oppose the proposition.

The Swedish government will also be required to define its position in the combined Scandinavian company S.A.S., in which at present S.I.L.A., D.D.L. and D.N.L., the Danish and Norwegian airlines, are co-partners. In deciding the future of Swedish airlines the co-operation of these two companies must be safeguarded. Since the Danish and Norwegian airlines are not owned by their respective governments, the situation would be difficult if S.I.L.A. was incorporated into a

SCRUTINIZING THE AMBASSADOR: A party from Skyways visited Christchurch last week in one of the company's recently acquired Skymasters. In the photograph on the left the charter company's aircraft can be seen taking off, and above Capt. R. J. Ashley, managing director of Skyways is discussing the power pack in the nose of the Ambassador with Capt. D. Brice, senior commander, and Major General Sir John Drummond Inglis, who has recently joined the board of Skyways.

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Swedish government monopoly. The Danish government hold 17 per cent of the shares in D.D.L., and the Norwegian government hold 20 per cent of the shares in D.N.L. Both of these companies each own two-sevenths of the Scandinavian Airlines System, and thus form a majority group. Continued Scandinavian co-operation would thus seem to be out of the question if S.I.L.A. were nationalized unless the Swedish government were prepared to allow the other two countries influence over inter-Continental air traffic.

BREVITIES

B.O.A.C. has introduced a cash on delivery system for air freight, operative where either the consignor or consignee is within the sterling area. The Corporation will collect the cost of goods, and also air freight charges if desired, and the facility will be available to all destinations on B.O.A.C. routes with the following exceptions: Sicily, Egypt, Sudan, Iran, Siam, Dutch East Indies and Australasia.

* * *

The weather information broadcast by the London sub-area, L.A.C.C. Uxbridge and O.A.C. Gloucester, is not being used as extensively as it might be. Weather reports are being requested from Area Control Uxbridge, and serious congestion on the A.T.C. communication frequencies is being experienced. The overloading is liable to create a danger to aircraft within the Flight Information Region, and pilots have been requested to use the routine broadcast whenever possible.

* * *

Further to the announcement that the Minister of Civil Aviation had decided to develop Llandow airfield before Fairwood Common as the airport for Cardiff, Lord Nathan has now made it clear that he is willing to consider authoritative representation for a change of the priority, and has invited the Welsh Advisory Council for Civil Aviation to consider the question and submit an opinion to him.

Deccan Airways have carried between July 1st, 1946, and May 1st, 1947, 11,787 passengers, 114,332 lb of freight, including newspapers, and 14,892 lb of mail. The company has established direct air connections between the North and South of India, and newspapers and mails are delivered daily to Delhi and Madras.

* * *

Pan American Airways' Clippers carried, during June, a total of 4,748 passengers over the two routes to Honolulu. From San Francisco 1,281 and from Los Angeles 1,024 passengers travelled to Hawaii. Inbound from Honolulu, 1,420 passengers flew to San Francisco, and 1,023 to Los Angeles.

* * *

Quantity discounts are to be applied to charges for the carriage of freight weighing 100 lb (45 kg) or more on B.O.A.C. services between the U.K., Ireland, Newfoundland and New York. The rates per kilogramme (2.2 lb) will be 4s 5d less on the London-New York service.

* * *

Landing fees at airports controlled by the Australian Civil Aviation Department became effective at the beginning of this month, and the government airline, T.A.A., will be required to pay the same rate as private airlines.

FROM THE CLUBS

Eleven privately-owned aircraft from the Wolverhampton Aero Club carried a contingent of twenty-five club members to the Deauville Rally. The W.A.C. claims to have the largest number of private-owner club members of any club in the country, and is nearly always well to the fore in attending aerial rallies and club events.

* * *

The Reading Aero Club, which re-started operations on July 1st, is reporting a steady increase in its membership. The reduced rate of only 5s for temporary flying members is attracting a number of R.A.F. officers who are anxious to do a little private flying and enjoy the amenities of the club. Incidentally all the membership fees have lately been reduced, the entrance fee and annual subscription for flying members now being £1 1s instead of £2 2s as previously announced.

* * *

To assist young men and women who are anxious to learn to fly, the Portsmouth Aero Club, in conjunction with the Portsmouth Branch of the Air League of the British Empire, have inaugurated a flying scholarship scheme. Local support for the scheme is very encouraging, and a general fund has been opened to help towards the cost of the scholarships. It is a commendable fact that, in the present absence of anything in the nature of a Government subsidy, several of the flying clubs around the country are offering flying scholarships for the benefit of the thousands of young people who are unable to afford the high cost of flying tuition. If youthful interest in aviation is to be maintained, every effort must be made to extend the scholarship scheme to more clubs.

* * *

July has been a busy month for the Derby Aero Club, and members have been taking advantage of the good weather and the long, fine summer evenings. W/C. Roxburgh, S/L. Porteous and F/L. Bramson flew three aircraft with a party of ten club members to the Deauville Rally which was held from July 12th-14th. The club is hoping to be well represented at the Southend International Rally on August 9th, in which S/L. Porteous has entered the club's little black Chiltern for the Southend-on-Sea Air Trophy. A successful dance was held at the clubhouse on July 19th.

* * *

Flying clubs in New Zealand are pressing for a scheme, similar to one already in operation in South Africa and Australia, whereby the respective governments pay £50 for every pilot trained to "A" licence standard and £10 for each pilot who completes enough flying annually for the renewal of his licence. In New Zealand it is feared that unless a government subsidy is forthcoming, some of the smaller clubs will go out of existence. At present sixty-eight out of a total of eighty-nine machines operated by New Zealand flying clubs are Tiger Moths.

* * *

The Redhill Flying Club, operating from Redhill airfield, Surrey, recommenced activities at the end of last May. Membership is now standing at 145, and since the club's re-opening over 300 flying hours have been logged, including five first solos. The seven finalists of the W.J.A.C. Southern Area "A" Licence scholarship were tested by Mr. J. K. Maxwell, the C.F.I. at Redhill.

* * *

Plans for the formation of a B.O.A.C. staff flying club are progressing favourably. The preparatory committees have held their third meeting and Mr. John Cobley, the chairman, has reported that he has discussed the club prospectus with B.O.A.C.'s chief executive, who has approved in principle the formation of a flying club to serve the interests of the staff.

AUSTRIAN TWO-SEATER: Mr. J. H. Davies' Hirtenberg H.S.98 at Gatwick. This small private aircraft was originally designed with a Siemens S.A.14A 7-cylinder radial engine of 145 h.p., but Mr. Davies, who is the London manager for Bristols, has had a Gipsy Major installed.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

LICENCE STANDARDS

A Defence of M.C.A. Examinations

I NOTE with interest the remarks in *Flight* of July 24th of your correspondent " Dutch " on Examinations and Flying Hours.

We at Air Service Training think that perhaps " Dutch " is not aware of the numbers of foreign students who do take the Ministry of Civil Aviation examinations. Prior to 1939 we had students of 39 different nationalities at our schools, and to-day we have not only French, Dutch, Belgian, Polish and Iraqi, but Iranian, Icelandic, Indian, West Indian, Persian, Palestinian, Norwegian, South African and Cypriot students undergoing instruction at Hamble for their M.C.A. examinations.

The language question is certainly at times a little difficult, but with excellent co-operation on both sides we have obtained very successful examination results.

I hope the foregoing will help to convince your correspondent that British training methods and the successful completion of M.C.A. examinations is still the desired achievement of the majority of foreign students. R. J. WOODHAMS.

A.S.T., Ltd., Hamble.

TOWARDS HAPPIER LANDINGS

A Plea for Distance-reading Equipment

I, TOO, would like to join " Vertigo " in complimenting F/L. Townson on his excellent account of the B.O.A.C. Liberator auto-approach trials at Prestwick. I am surprised, however, that " Vertigo " made no mention of the value of a distance indicator to the technique generally and in particular to assist in entering the localized beam at any prearranged distance.

Distance-reading equipment has a number of advantages (and is capable of wide application in short-distance navigation), but none more useful than in association with the auto-approach procedure to give the pilot his exact distance to touch-down point and all the confidence that results from such knowledge. In " Vertigo's " improved instrument layout I feel sure he will make way for the distance indicator; in fact, unless I am much mistaken, he did so on one memorable occasion

When the auto technique comes into general use (and the happy little band of pioneers have never for a moment had any doubts about it)—probably about 1951—" Vertigo " hopes, I am sure, as I do, that there in the most prominent position of all will be one of the pilot's best friends, his D.I.

J. A. McD.

THE LABOURER IS WORTHY OF HIS HIRE

Control Officers and their Salaries

ON many occasions I have listened to " bleats " by aircrews and operators of aircraft upon the inefficiency of Flying Control in general. I do not propose to enumerate these, as they are numerous and often trivial. I, too, have suffered.

However, knowing the average Control Officer to be a pretty good type, with more than somewhat to do on a busy station, and knowing also the natural impatience of captains of aircraft to put their machines safely on the ground in as short a time as possible, especially under unfavourable weather conditions, one must not always attach too much importance to all of these " bleats."

It is interesting, also, to listen to the other point of view. The Control Officers have their " bleats," too, and not always without good cause.

They have a very responsible job. I feel, but I am open to correction, that the best type of Flying Control Officer is the ex-pilot. He can readily envisage the problems that confront the normal aircrew and can well imagine the occasional odd spot of " panic in the cockpit." This makes him both patient and sympathetic.

I do not say that there are not good non-flying types who are Control Officers I know there are. This brings me to the point I really wish to make.

There comes a time when a pilot, for one reason or another, gives up active flying. He naturally looks around for a job, first, in something to do with aviation, and, secondly, at a salary that approaches to what he was earning as a pilot.

In the past, what has he found when looking for a control job which, after a certain amount of instruction, he could fill efficiently and with far less training than the average non-flying type? What has he been offered to take up this post?

In comparison with the importance of the job, a mere pittance. Consequently the majority of the best types must have been lost.

" A man shall render according to his talents."

To obtain the best talent, a fair and reasonable exchange must be made. In other words, a decent salary offered. And until this is realized, advertised and put into action by the powers that be, I cannot see the right men, whether flying or non-flying types, being attracted to these responsible posts.

T. NEVILLE STACK.

AIRCREW CADET COMPLAINT

Disappearance of the White Flash

PERHAPS some of your more Service-minded readers may be interested to hear that the days of the White Flash are now numbered. The White Flash was worn in the field service caps of aircrew under training.

Aircrew cadets are now recognized by the rather striking badges on the arms—a laurel wreath surmounted by a rampant albatross. Now, on graduation following months of sweat, blood and toil, of flying courses, etc., instead of the previous sergeant's chevrons one has a most beautiful star to stitch beneath the rampant albatross! "CADET PILOT."

BALPANIC ?

The Transference of Responsibility

I THINK the writer of the leading article in your issue of July 24th, 1947, was more concerned with justifying his ingenious title than he was with the facts of the case.

The request for information concerning the responsibilities of the airline captain in connection with Flight Refuelling was submitted *before* the recent tests began, though this may not have been clear from the Editorial in " The Log." But, more importantly, whether tests prove satisfactory or unsatisfactory does not affect the points raised by B.A.L.P.A. In this instance, B.A.L.P.A. was concerned with legislation or proposed legislation and not with the practical application of Flight Refuelling.

There is surely nothing very curious about a captain being concerned about regulations which affect the safety of his aircraft and its passengers when he has another aircraft flying very close to him. There can be no transference of responsibility ffom the captain of the airliner to the captain of a tanker, however experienced he may be, and in this connection your leader-writer's analogy of the captain of the ocean liner handing over the responsibility for the safety of his ship to a pilot when steaming into port seems curiously strained.

For the sake of an ingenious title do not let us condemn responsible people seeking for information on what, as your writer was pleased to say, were pertinent questions to which the general public as well as B.A.L.P.A. were entitled to full and complete answers.

At any rate, the Ministry of Civil Aviation, through its Director of Technical Services, fully appreciated the spirit in which the Association made its approaches.

D. FOLLOWS, Secretary of B.A.L.P.A.

[*The request for information concerning responsibilities was, as we said in the leading article, perfectly pertinent. Our point was that it appeared to have been somewhat belated for, as our correspondent admits, the Editorial in " The Log " certainly did not make clear the fact that it was made* before *the tests began.*

As for the somewhat sweeping statement that " There can be no transference of responsibility from the captain of the airliner to the captain of the tanker, however experienced he may be," it all depends upon what is meant by transference of responsibility, as Dr. Joad would say. If our correspondent dislikes the comparison with a liner captain, he can find many analogies in flying. In the R.A.F. the leader of a flight is skipper of that flight, but his individual pilots are responsible for proper station-keeping to avoid collisions. When an aircraft pilot is being talked-down in bad visibility, he is sharing his responsibility with the man on the ground.—ED.]

"Flight" photograph.

COUNTY OF MIDDLESEX: Officers of No. 604 (County of Middlesex) Squadron, Auxiliary Air Force, with a smart Spitfire at Hendon a few days ago. They are, left to right, F/O. L. G. S. Hodgkinson, F/O. H. E. H. Gillett, F/O. E. W. Aries, A.F.C., F/L. J. W. S. Smith, M.B.E., D.F.C., F/O. A. Deytrikh.

S. of S. at Cranwell

THE Secretary of State for Air, Mr. Philip Noel-Baker, M.P., told the 68th Entry of Aircraft Apprentices of No. 1 Radio School, R.A.F. Cranwell, at their passing-out inspection on July 29th that although not all of them could be Air Chief Marshals, they would all have the opportunity to achieve that rank. He recalled that Air Commodore Whittle was an aircraft apprentice, and said that the percentage of promotion from the ranks in the R.A.F. was very high. Among the apprentices passing out were 26 Polish boys who in 1939 were deported to Russia from Eastern Poland, and thence to Persia and Palestine before coming to England to be trained as aircraft apprentices. They were the first Polish entry to pass through Cranwell and the first to be given instruction in radar. Of them, Mr. Noel-Baker said they had achieved a fine record after overcoming extreme difficulties and although some of them might not know their future, he was sure they would use the instructions they had received to promote the cause of aviation wherever they might be. Three apprentices from the entry were awarded cadetships to R.A.F. Cranwell. They were Sergeant Apprentice J. H. Rogers, Leading Apprentice M. Short and Leading Apprentice G. J. Ward.

Accompanying the Secretary of State were Air Chief Marshal Sir Roderic Hill, Air Marshal Sir Ralph Sorley, and Air Commodore R. L. R. Atcherley, Air Officer Commanding, R.A.F. Cranwell.

Anti-Shipping Trials

DURING this year and next about ninety warships are to be targets in the Navy's programme for determining the effect of shock and flash damage by under-water explosions, static bomb detonations, air-burst bombs, magazine flooding, and air attack against massed shipping. One of the doomed ships is the 22,450-ton aircraft carrier H.M.S. *Furious*.

Durham Squadron in Camp

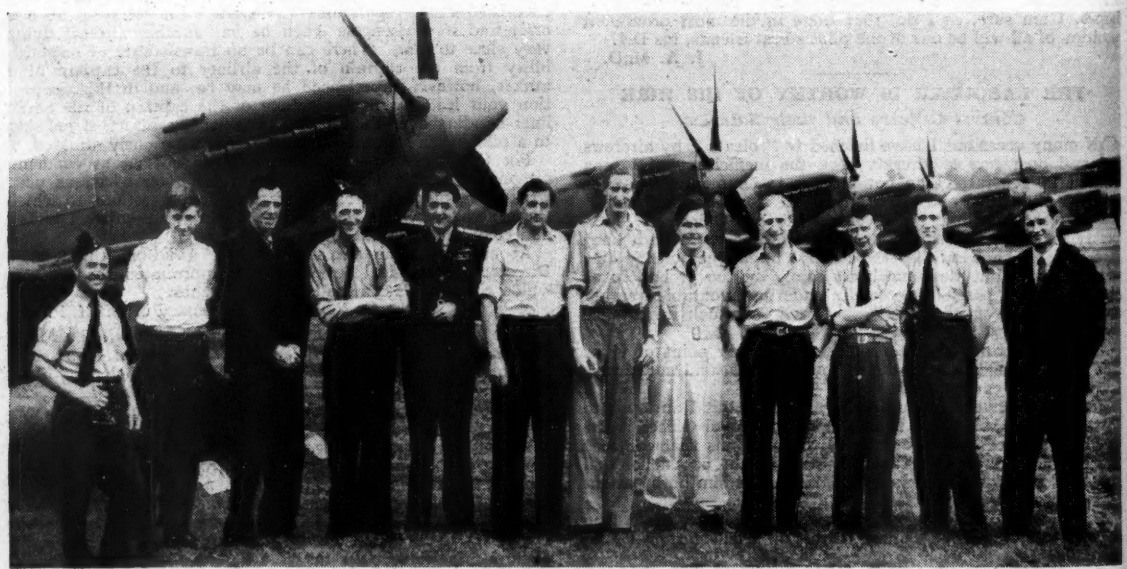
THE only R.A.F. summer camp in Scotland this year is that of No. 607 (County of Durham) Fighter Squadron, which was at the Coastal Command Station, Leuchars, from July 19th to August 2nd. Seventy officers and men, six Spitfires and three Harvards attended, and all worked hard. The first aircraft were off before 6 a.m. Three pilots went solo on Spitfires during the first week, and others were doing fighter affiliation exercises with Lancaster reconnaissance aircraft operating from Leuchars. The Spitfires flew with loaded guns for the first time since the war, when air-to-ground firing was done on the Leuchars ranges and at sea. There were visits by the A.O.C. of No. 64 Northern Reserve Group (A. Cdre. B. V. Reynolds, C.B.E.) and by the Squadron's Hon. Air Commodore, Mr. Leslie Runciman.

SERVICE

Royal Air Force News

Airmen's Grievances

AN officer, warrant officer or senior N.C.O. may, in future, act as "airman's friend" to help an airman in presenting a grievance. In certain circumstances a complaint may be sent up for consideration by the Air Council. These innovations also apply to the W.A.A.F.



"Flight" photograph.

COUNTY OF LONDON: Members of No. 601 (County of London) Squadron, A.A.F. Pilots shown are F/L. J. M. V. Carpenter, D.F.C., P/O. I. K. Crawford, D.F.C., F/O. H. S. L. Dundas, D.S.O., D.F.C., F/L. R. J. S. Spooner, F/O. J. H. Villiers and Pilot I J. N. Airey. Another pilot is Pilot I S. W. Letchford.

DEMONSTRATIONAL FORMATION: Spitfires, clipped and full-pan, of No. 601 (County of London) Squadron after their display at Elstree recently. A report of this event appears in this issue. Like a number of other A.A.F. Squadrons, No. 601 is armed with pitfire Mk. XVIs. Eventually, de Havilland Vampires may be issued to A.A.F. Squadrons now equipped with Spitfires.

AVIATION

Naval Aviation

nouncements

R.A.F. Regatta

THE newly formed R.A.F. Rowing Association will hold its regatta at Kingston-on-Thames on Saturday, August 30th, instead of on September 6th. The latter date was found to clash with other regattas.

Battle of Britain Memorial

SINCE July 31st, the Battle of Britain Memorial in Westminster Abbey has not been on view to the public without fee. Arrangements have been made, however, for the issue of season tickets to next-of-kin of aircrew, commemorated in the Battle of Britain Memorial Roll of Honour, who are known to have lost their lives in the Battle (between July 10th and October 31st, 1940) which will enable them to view the Chapel without fee. Applications for season tickets should be addressed to Air Ministry (S.4(d)), King Charles Street, Whitehall, S.W.1, giving the number, rank and full names of the aircrew commemorated in the Roll of Honour and stating the relationship of the applicant. Tickets will not be issued except on application, and will not be available for use on Sundays.

Chapel Fund Over-subscribed

IN a recent letter to the Press, Marshal of the Royal Air Force Viscount Trenchard recalled that in December, 1943, an appeal was launched for £22,000 for the Battle of Britain Memorial Chapel. Nearly £70,000 was, in fact, subscribed, and when all accounts have been paid, including administration expenses, a surplus of about £55,000 will be handed over to the R.A.F. Benevolent Fund.

U.S. of S. at University Squadron Camp

MR. GEOFFREY DE FREITAS, M.P., Under-Secretary of State for Air, flew to the R.A.F. Station, Manby, Lincolnshire, on July 26th to visit the University Air Squadrons in camp there for their two weeks' annual flying training. These include Birmingham and Nottingham University Air Squadrons. The Air Council are particularly anxious to encourage the squadrons from these two universities in view of the emphasis on engineering training.

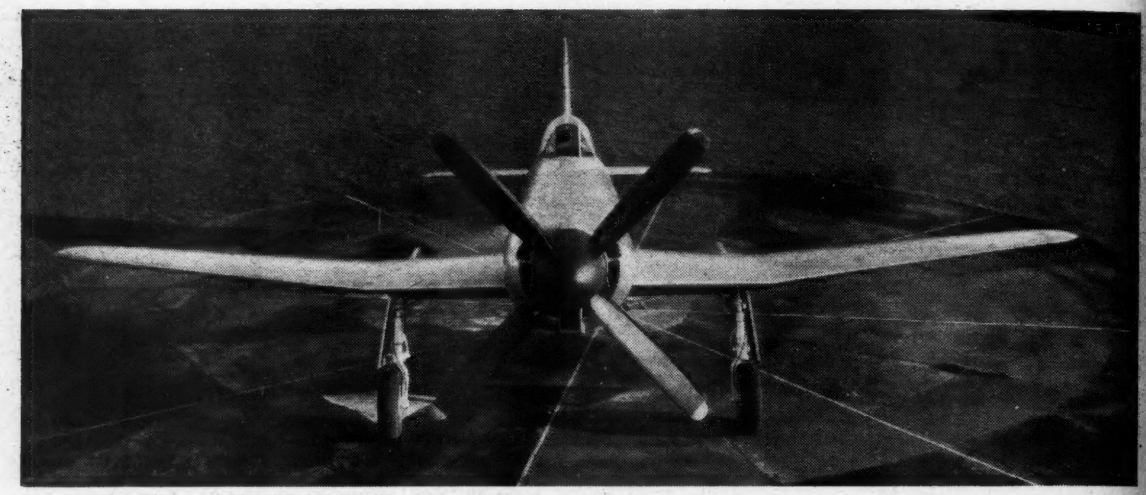
R.A.F. Moves in at Larnaca

THE airfield at Larnaca, on the south coast of Cyprus, was taken over by the R.A.F. on July 23rd. A flight of fighters will be based there.

P.R.U. over U.K.

AIRCRAFT of Coastal Command Photographic Reconnaissance Squadrons provided 25,000 photographic prints during April and May last after flights over the United Kingdom. This represents a coverage of 6,700 square miles. The majority of the sorties were on behalf of the Ministry of Town and Country Planning and the Ordnance and Survey Department. Other jobs were undertaken for the Department of Agriculture and Fisheries, the Ministry of Civil Aviation, the Army Staff College and the Ministry of Road Transport. The Northern Army Command and the Department of Health for Scotland were also served. The aircraft belonged to Nos. 58 and 82 Photographic Squadrons, normally based at R.A.F. Station Benson. They completed 161 sorties.

COUNTY OF DURHAM: Officers of No. 607 (County of Durham) Squadron, A.A.F. They are F/O. Raine (on cowling), F/L. McConnell (on mainplane), left to right: F/L. J. Collingridge, F/L. J. M. Bazin, D.S.O., D.F.C., F/O. J. Kennedy, S/L. J. R. Kayll, D.S.O., D.F.C., O.B.E. (C.O.), F/O. J. Baxter, F/O. A. B. Dunford, D.F.C., F/L. W. F. Blackadder, D.S.O., O.B.E. (adjutant), P/O. R. C. Thompson and F/L. Hope-Pool (M.O.)



COMPASS-BASED: An attractive view of the new Westland Wyvern (pronounced "Wivvern") Naval strike-fighter with a Rolls-Royce Eagle engine of 3,500 h.p. The first prototype is seen on the compass base at Yeovil.

Arabic Studies

SIX R.A.F. officers are likely to be selected to attend the next course at the Middle East Centre for Arabic Studies at Zerka, Transjordan, which provides training for officers of the three Services for posts requiring a background of Arabic, Islamic and Middle Eastern history and customs, as well as a knowledge of the Arabic language and the problems confronting the Government in the Middle East.

Far East Weather

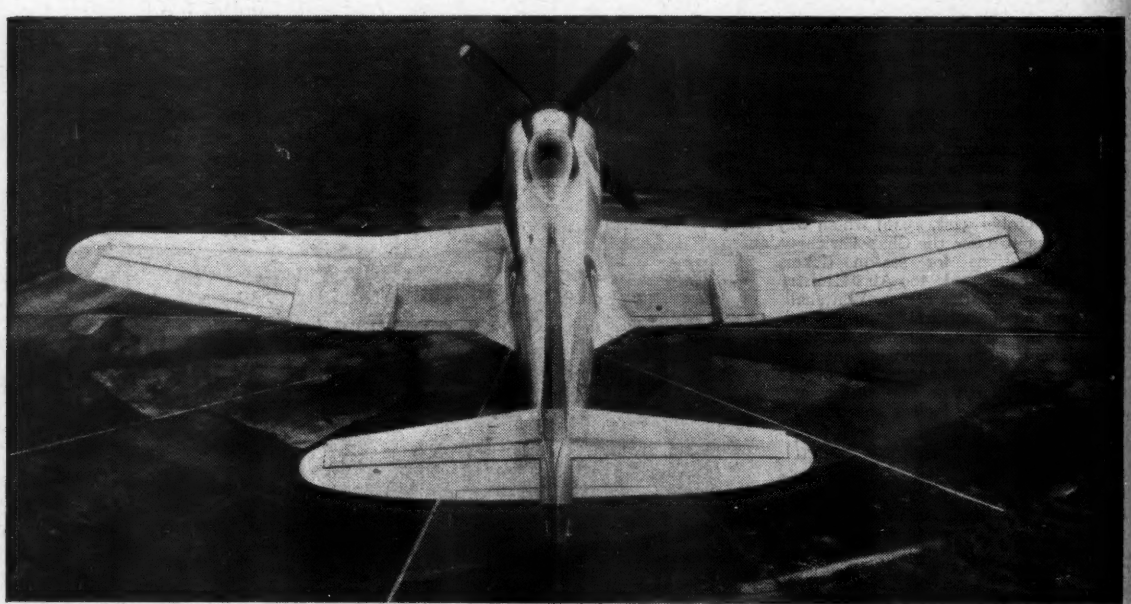
THE establishment of an Air Ministry Experimental Station on the hills overlooking Changi airfield, near Singapore, Headquarters of Air Command, Far East, means that flying from this airfield has become safer. The station is manned by some thirty R.A.F. personnel, including radar operators, who take turns in keeping a watch in a radar van to plot rainstorms and thunderstorms. The information is passed to the Air Command, Far East, Meteorological Station, which in turn informs the pilots of all aircraft in the affected zone of the weather conditions they can expect.

Italian Inspection

THE Under-Secretary of State for Air, Mr. Geoffrey de Freitas, M.P., made a short inspection of Royal Air Force units in Italy and Austria last week. He talked informally to officers and airmen and paid special attention to the work of the men and their living conditions. Mr. de Freitas, accompanied by W/C. A. H. Smythe, D.S.O., D.F.C., A.F.C., acting as his personal assistant, and his private secretary, Mr. J. A. Millson, left Northolt on July 28th in an R.A.F. Transport Command Dakota for Udine, Italy.

R.A.F. Regiment Officers' Dinner Club

THE first dinner of the R.A.F. Regiment Officers' Dinner Club will be held on Thursday, September 25th, at 7 p.m. for 7.45 p.m. at the Cafe Royal, London. Admission will be by ticket only (£1 1s) and all past or present officers of the R.A.F. Regiment are invited. Further information may be had from Mr. L. S. Symons, 63, Woodgrange Avenue, Kenton, Middlesex.



STERN ASPECT: The businesslike rear aspect of the Wyvern, showing the "kinked" wing and the flap guides. The laminar-flow wing, of 44ft span, folds to 18ft.